SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

MINING IN CALIFORNIA AND NEVADA.

We have already, in another part of the Journal, drawn attention to one phase of Consul Booker's report on the Trade and Commerce of California, and in the present artiele we propose to advert, as briefly as may be, to his carefully drawn up observations on the subject of mining.

At the commencement of 1875 there appeared to be good ground for looking forward to a more than usually prosperous year; but the scarcity of rain in the spring, and, what was of more consequence, of snow in the mountains, caused the supply of water in the autumn months to be insufficient to work many of the hydraulic mines, in consequence of which the yield of the gold mines was fully $2,500,000 short of 1874. Every year more hydraulic mines are being worked; but there is frequently great expense incurred in getting them into working order. Many require long tunnels for drainage purposes, and, in some instances, the water has to be brought from a great distance, and storage reservoirs have to be constructed in the mountains. Hydraulic mining is now extensively carried on in ten counties, and it is stated that the number of mining ditches is 673, which are 5179 miles in length. In the county of Nevada, the great centre of quartz mining, there is a falling off from preceding years, but this county is rarely without some one mine yielding largely. There were no important discoveries during the year; the new district in Inyo County has not produced the quantity of base metal expected from it. For a long time there was a large gathering of miners and speculators about the range of mountains in which the discovery was first made; but after a few months of prospecting the district was abandoned by most of those who had flocked to it, and at present only a few of the more promising mines are being worked.

The silver mines of the State of Nevada produced in 1875 over $40,000,000, of which amount one mine (Consolidated Virginia) contributed close on $17,000,000. As mentioned incidentally in another paper a disastrous fire in October destroyed the hoisting-works of this mine and stopped for several weeks the extraction of ore. As the Consolidated Virginia is probably at this time the most productive mine in the world, it may be interesting to have an exhibit of some of the items from the annual reports of the president and superintendent:—

Receipts from bullion	$16,953,771
Disbursements—Superintendents	142,471
Fire-wood and timber	38,437
Reduction	2,198,286
Bullion freight	50,383
Salaries and wages	760,698
Dividends	12,204,000

During the year 169,307 tons of ore were extracted from the mine, taken from the 1200, 1300, 1400, and 1500 ft. levels.

The California, adjoining the Consolidated Virginia Mine, has been very thoroughly prospected by cross-cuts and drifts on the 1300, 1400, 1500, and 1550 ft. levels, and bids fair to rival its neighbour in richness. The prospecting has been done from the Consolidated Virginia Mine, the shaft of the California not yet having been sunk to the levels above mentioned; this shaft has three compartments, and is 938 ft. deep; 288 ft. have to be sunk to reach the drift where the working will be commenced. The hoisting capacity will be 2000 tons per day. The superintendent reports that his efforts have been confined to opening the mine as thoroughly as possible on all the levels; and, at the same time, to take out as little ore as possible, which will account for only 5123 tons having been extracted. Having furnished an account of what has been done Mr. Consul Booker gives a long extract from a report by the director of the United States Mint, who was on the coast at the opening of the new Mint at San Francisco last year. This is followed by the report of Prof. E. Rogers, dated Nov. 15, 1875, from which we think it will be interesting to abridge the following information. We may premise that Prof. Rogers was requested to examine both the Consolidated Virginia and the California Mines, on the Comstock lode, and to furnish his opinion as to their probable yield of gold and silver. The following brief desciption of the position of these mines, which lie at the same general line of ore body that consitutes what is commonly known as the Comstock lode, may aid the reader in forming a better idea of their nature, and will serve to explain the principles which have guided the engineers and superintendent in laying off the work for exploring their extent and mining the ore. The surface of the whole country round Virginia City is rough, broken, and hilly. At this immediate locality there is a long lofty range extension of the Washoe Mountains, at places many hundred feet in elevation above the plain, whose steep slope to the valley below faces towards the east, and whose general trend is north and south. About midway up the slope the croppings of the ore of these and many other mines of the lode are visible. The first excavations which were made in the early workings were upon these croppings; but in due time it was discovered that the ore body dipped towards the east in a measure parallel with the surface of the mountain side, though having no physical or geological relation to that superficial outline. As a consequence of this discovery the present shaft, known as that of the Consolidated Virginia Mine, was sunk at a point down the slope many hundred feet to the east of its outcropping. It is from this shaft that all the ore from that and the California Mine has been lifted until the recent fire, by which the hoisting machinery was destroyed. From the conditions of the slope of the ore body of these mines it was evident that no ore could be looked for until several hundred feet had been reached. In point of fact, 1300 ft. of rock were passed through before any horizontal drifting was done to intercept the ore. At this level profitable ore was found, and the shaft was then sunk 100 ft. lower, and another horizontal drift was run in to test the continuance of the ore. It being found that the ore body was undiminished, and even richer than that of the level above, the shaft was carried down 100 ft. more; and, finally, under the encouragement afforded in every successive foot of descent, a double winze has been put down recently in the California Mine to a depth of 110 ft. below the 1550 ft. level. The shafts have been sunk successfully to the depths mentioned, the principle adopted for exploring and probing the extent of ore on each level being to run galleries and cross-cuts. In speaking of these mines Prof. Rogers has treated them as one. The line which divides them is only a property boundary, there being two companies under one manager. The claim of the Consolidated Virginia Mine is 710 ft. long, and that of the California 600 ft. The explored width of the ore mass on the 1500 level averages 250 feet. The west boundary wall is that of the mountain rock—syenite; while the east boundary, which can hardly be termed a wall, is ferruginous clay. The ore body itself consists of a semi-crystalline, somewhat granular, matrix of quartz, sometimes compact, but more often friable and easily worked, crossed and roofed over with whitish clay containing the precious metal, associated with several of the base metals and a variety of other substances. The nodular and rocky masses scattered at the lode, at times of a magnitude to form what is termed a "horse," is a potash felspar, and named by the miners porphyry. The following is Prof. Rogers' description of the composition of the ore mass:—Quartz, the largest constituent, constituting the matrix; gold, metallic; silver, metallic; silver glance, or sulphate of silver; polybasite (silver, copper, iron, zinc, antimony, arsenic, and sulphur); stephenite (silver, copper, iron, antimony, and sulphur); blende (zinc and sulphur); galena (silver, lead, and sulphur); horn silver, in small amount (silver chlorine); alumina (as clay); carbonate of lime; and sulphate of lime. In this ore the gold is in the metallic state. The silver, too, is metallic, and also as sulphide and chloride, and likewise in the complex and mineral forms just mentioned. The iron, copper, lead, zinc, antimony, and arsenic are in a condition of combination of sulphur as sulphides of those metals. The silica and clay are simply in mechanical association with the above.

With the data in his possession and the maps before him, Prof. Rogers ventures upon the following calculations and estimates of the total ultimate product of the gold and silver of the ore body of these two mines. On an inspection of the official surveys, exhibiting the galleries and cross cuts, it seems to him fair to conclude that, with proper allowances, the ore body equals an amount which, taken at the actual assays, would give the ultimate yield of the two mines at $300,000,000; but, to guard against an over-estimate, he would take the assays at half that ascertained, and place the production at not less than than $150,000,000. With a view to make due allowance for interruptions to the continuity of the body of ore which lies between the 1500 and 1400 ft. levels, the whole of the ore contained between the 1400 and 1300 ft. levels is thrown in, and not embraced in the estimate. The very promising ore developments below the 1550 ft. level, the assays of which run very high, have also been omitted in Prof. Rogers' calculations.

Next in order in his report Her Majesty's Consul furnishes a very elaborate table, giving much interesting information in regard to the leading mines of Nevada, but the space at our disposal will not admit of our dealing with the valuable statistics therein placed before us.

QUICKSILVER.—The yield of quicksilver was 57,131 flasks in 1875, which shows an increase of 20,000 flasks over the previous year. The New Almaden, New Idria, and Redington Mines have each increased their production, and many new mines under the encouragement afforded by high prices for quicksilver have been opened. The Guadalupe, in the neighbourhood of the first-named mine, which had been closed for many years, was again worked with marked success, the yield with one small furnace being 3415 flasks. The quicksilver deposit, known by the name of the Sulphur Bank, in Lake County, owned by the California Borax Company, is so different to all other cinnabar mines in the country that Mr. Booker thinks a few items in connection with it will be read with interest. It forms the southern slope of a long low ridge or hill, which skirts the extreme eastern end of the south shore of Clear Lake. The ground between Sulphur Bank and the lake shore is nearly level, and but a few feet above the water. At a distance of several hundred feet from the shore line the surface begins to rise until the top of the elevation is somewhat over 100 ft. above the water. The rock composing the main body of the hill is of volcanic origin, chiefly basaltic lava, but occurring in various forms, some hard, heavy, and compact, some light and cellular, and much more of it more or less decomposed. The bank in which cinnabar has been found is about ¼ mile in length, and about one-third as much in width; it is without soil or vegetation, and its incrusted surface is like that generally found by the flow of hot mineral springs. Several deep cuts have been made, which show a somewhat varied character. Some of them expose a good deal of rocky ground, in which the proportion of valuable mineral is very trifling; in others there are generally large masses of boulders which are enclosed in and surrounded by a soft earthy material. The boulders are in various stages of decomposition and disintegration; where hard and unaltered they appear worthless, and when considerably decomposed they are penetrated by seams which carry cinnabar. The surrounding earthy mass generally shows streaks, seams, and lumps of cinnabar, and again in others the proportion of boulders is less. The ground in parts consists largely of a dark, moist, earthy material, a sort of hardened mud, compact, but easily picked down; the mass is very moist, and the water highly acid.

In this ground sulphur abounds, and the cinnabar occurs in streaks, seams, and bunches, and is almost always to be found wherever sought for. In some places the cinnabar deposit assumes the proportions of an ore body; in one part there is a body of rich ore of cinnabar crossing the deepest part of the excavation, showing on both sides, and having a thickness of 4 or 5 ft. In these cuts where sinkings have been made there are springs of hot water issuing accompanied by carbonic acid, and a strong smell of sulphuretted hydrogen prevails in their neighbourhood.

From the foregoing details, furnished by Mr. Consul Booker, it will be seen that the cinnabar is not uniformly distributed. In the east end it is richer and more disposed to occur in a massive form; in the west it is very widely and finely distributed, but the ground does not appear to be so rich. Experts have estimated the quantity of ore in the obviously ore-bearing ground at 662,000 tons, and the quantity of metal at 1·75 per cent. More than half of the quicksilver has been extracted by direct treatment in furnaces, and the rest by the retorting of the cinnabar obtained by washing the fine ore obtained in rockers, &c., concentrating the valuable mineral. Ten Chinamen have washed about 10 tons daily, yielding about 1500 lbs. of cinnabar. The dirt thus washed is all preserved for further treatment by some more efficient process. The first furnace had a capacity on ordinary ore of 24 tons per diem, but owing to the large amount of sulphur contained in the ore, and the time required for its combustion, and further to the large amount of moisture, the daily duty was only 10 tons.

The cost of production is not great, as the removal of the ore is easily effected, and the sulphur, by the ready ignition of its vapours, maintains the fire with a very limited quantity of fuel. The exports in 1875 were:—China, 18,190 flasks; Japan, 968; Australia, 832; Mexico, 5757; South America, 2149; Chili, 355; New Zealand, 258; other countries, 451: total, 28,960 flasks. The price at the commencement of the year was $1 55 c. per lb., but under the increased production it rapidly fell to 65 c. in July, after which it rallied to 80 c., 85 c., and at the close of the year it fell to 60 c. per lb.

MINING ON THE PACIFIC COAST.

SIR,—Trips around the world are getting so common now-a-days that the passage to America and journey across to San Francisco by rail are thought little of. However, in the latter there is much to interest—the hundreds of miles of farms, large towns and cities, endless prairies, rocky deserts, mountain peaks covered with everlasting snow, deep gorges, the last remnants of the once mighty lord of the land, Mormon industry, the white man's skill in crossing the mountains by rail, all constitute a panorama so varied and marvellous as can never be forgotten.

At Virginia City I was much astonished at the extent of the mines, the thorough completeness of the equipments above and under ground for removing the ore from the stopes and levels to the shafts to be hoisted to surface, pumping machinery so large and well made as may well make Cornishmen look to their laurels in this direction—one shaft equipped to go down 3000 ft. and another 4000 ft. On the surface no expense is spared in the erection of suitable apparatus for stamping, self-feeding, and the extraction of the noble metals. I was under the impression that the bullion contained about 40 per cent. of gold in bulk, but was informed that it was 40 per cent. in value, or (say) silver 950 fine, $122·83; gold 45, $93·02 = $215·85 per ton.

Through the courtesy of the superintendents I was allowed to go underground at the Belcher Mine, and through the mills, assay offices, &c., at the Virginia Consolidated. Miners earn $4 per day, mechanics more; hundreds out of work. One man told me it was extremely difficult to get a job, and more so to keep it. In troublesome places Cornishmen have the post of honour. A favourite pastime indulged in by almost everybody is investment in stocks; and, judging by the many elongated faces turned up at the brokers' lists, many are sadly bitten. There is no doubt that capital judiciously and honestly invested in the mines on the Pacific Slope will amply repay the investor.

At Grass Valley I had an opportunity of examining the Idaho Gold Mine and mill; it is well opened out, with large reserves, making fair profits, and in the hands of non-speculative proprietors. About 90 tons of rock per day is treated in a 35-stamps mill, the sand passes over blankets, then over copper plates, &c., to the buddles, where the pyrites are concentrated, and this is taken to the chlorination works to extract the gold. The sand is further treated before it is allowed to escape.

The Gravel Mines in the vicinity of Nevada City are well worth a visit. Through the courtesy of Mr. Tilley I was shown some of them, and the Pennsylvania Mine belonging to an English Company, of which he is the superintendent. The mine is just now in abeyance. A tunnel has been driven some distance, hoping to reach the bed of an old river, hitherto without success. I think before closing the mine the directors would do well to push on the tunnel another 1000 feet, this would settle the question for ever, and could be done cheaper now than at any other time. People say the chances are good. Time did not permit me to visit the Blue Tent property, spoken highly of in the district.

Mining is making rapid strides on this continent, what with Blake's stone-breaker, self-feeding apparatus to the stamps, Ingersoll's and Diamond drills, and other labour-saving machinery, added to the speculative spirit which stops at nothing that can be accomplished, America, if not already, will soon be at the head of the mining world. The large and well appointed machine shops in San Francisco turn out some of the best mining machinery in the world.

There is another subject intimately connected with the welfare of mining in this and other places—the reduction of ores of gold and silver containing a large amount of the baser metals; the present plan of stamping and amalgamating cannot extract the gold and silver, and smelting is too expensive, a Mr. Fryer has been at work for the last 18 months in another direction. I conversed with men from different parts of the country at the works; some pronounce it a decided success, others an unmitigated sham. I think it is a step in the right direction, and if Mr. Fryer fails others will carry on the experiments to a successful termination. I enclose an account of the process, which will no doubt interest some of your readers.—*San Francisco, June* 1. JOHN SPRAGUE.

NEW METHOD OF REDUCING ORES OF THE PRECIOUS METALS.

Much attention is being directed at the present moment to a new process of reduction, the invention of Mr. Fryer, for the development of which the Fryer Noble Metal Mining Company have just erected works in Grass Valley. The furnace in which from 3 to 4 tons of ore can be roasted at once, or from 12 to 20 tons per day, is an upright cylinder 18 ft. high and 5 feet across inside. It consists of double walls of boiler iron, between which is formed a water jacket, upon the principle that a kettle kept full of water is not injured by fire. This water jacket prevents the inner wall of iron from being injured. When the process is in operation the water between the walls becomes steam, and at a certain point blows off through a safety-valve and rushes up through the inside of the furnace, increasing the draught very materially, or can also be utilised for running the machinery. When the water is reduced in the jacket an automatic valve turns on a fresh supply. Below the furnace (which is entirely open at the lower end) is a pan built also like the furnace, with hollow walls and water jacket. At the top of the furnace is an iron cone over which there is a constant flow of cold water with which the volatile gases must come in contact, and thereby a sudden reduction of temperature. They are precipitated in the form of solid metal in small water tanks at the side. By this means much gold is saved which is usually lost by volatilisation.

After the charge has burned out (which requires about four hours) the mass of roasted ore settles down into the pan, and is dumped down into a preliminary crusher below, from which it is next run along a track and turned into a hopper communicating with the crusher and amalgamator, which is a vast improvement on the old stamp mill and its complicated accompanying machinery. It is simply a combination of 16 hollow cylinders projecting like the spokes of a wheel from a transverse axis. The cylinders are in pairs. When charged each cylinder contains from 150 to 250 lbs. of ore, 3 lbs. of mercury, a small quantity of warm water, and a chemical to prevent the quicksilver from "flowing."

The centre plates are now screwed tightly to their places, and the operation of crushing and amalgamating is ready to begin. The charging occupies about ten minutes, and the apparatus corresponds with a five-stamp battery of a common mill, doing about the same amount of crushing, besides amalgamating at the same time. There is now in each cylinder a hollow cylindrical weight falling back and forth as the crusher works, and makes about ten revolutions per minute. The weight, which is of iron, weighs 250 lbs, and its first motion is when it starts down the slight incline, grinding the ore beneath on each side. As the incline grows steeper and assumes a perpendicular the weight falls upon the loose ore which has fallen through its centre, crushing it with a blow. As the cylinder ascends the other side the operation is reversed. Each weight works two blows at each revolution, or 20 in a minute, equalling 320 blows in all, with the crusher making ten revolutions per minute. The crushing goes on very rapidly, and in three hours reduces the ore to a fine pulp, but in order to make the amalgamation perfect five or six hours is required, crushing the pulp fine as flour. One of the great advantages of this apparatus is that it is built in sections, the heaviest weighing but 300 lbs., so that it can be packed upon the backs of mules into the most mountainous regions. The capacity of the crusher is from 5 to 10 tons each for 24 hours.

When the amalgamation is completed the centre plates of the cylinders are unscrewed, and the pulp discharged into a boat-shaped vessel, at the bottom of which is an outlet leading into an iron box, through which a pipe injects water with considerable force. This jet of water separates a portion of the amalgam from the pulp, and by its weight it falls into the bottom of the box and lodges in a depression out of the way of the force of the water. From the other side of the box another pipe leads into the separator which is a large funnel-shaped wooden box, with a pipe sending up a jet of water from the bottom, keeping the contents in constant agitation. When the pulp is forced through the pipe by the water jet it reaches the separator in a condition to free itself of its amalgam, which, immediately on being thrown into the seperator, sinks by its weight to the bottom, while the worthless pulp is being kept in solution at the top. When the contents of the separator have risen nearly to the top the pulp begins to run off, and what little precious metal is contained here is caught on copper plates in a revolving iron box. There is so little gold to be caught here, however, that the last apparatus can easily be dispensed with without great loss. It appears that in the treatment of rebellious ores the new process works them as high as from 85 to 95 per cent., while the ore of the Comstock is generally worked at 70 per cent., and it is claimed that whilst it treats the heretofore unmanageable rebellious ores, it can also work the ores of the Comstock at a greater profit and less expense than any Comstock ore is now being worked.

As to the cost of the machinery, it is stated that a complete plant, capable of treating 2 tons per day, can be supplied at proportionally less than the ordinary quartz mill. This, of course, will consist of a furnace and a four-cylinder crusher. As the mine pays, and the miner increases his capital, he can add more crushers, and so increase his working capacity continually. A crusher of 16 cylinders works from 5 to 10 tons daily, and more crushers can be added, all worked by the same engine, just as new batteries can be put on a stamp-mill. Machinery to work 20 tons of ore per day will cost $18,000; to work 100 tons, $75,000, either for gold or silver. It is stated that at present mining companies lose thousands in the gold which runs off with the tailings; but that Fryer's process saves so much of the gold that the tailings, which have hitherto been a source of profit to those working them, are now really worthless.

MINING IN QUEENSLAND.

SIR,—The quantity of tin forwarded from the Warwick Railway Station for the month of March was as follows:—

	Tons.	cwts.	qrs.	lbs.
Stream tin	339	9	1	18
Ingots	15	10	1	22
Total	353	10	3	13

Being about the same in quantity as during the previous month, and about 50 tons less than during the same month last year.

The quantity forwarded during the quarter was 1040 tons stream tin, and for the same quarter of 1875 1080 tons, showing a falling off of only 40 tons. During the month the water has got scarce, and numbers of men have been knocked off, and several have started for the new rush to the Palmer. Against this we are told by the local press that one company—the Brisbane (Limited)—have been washing out 50 tons of stream tin per week for some time back, with every prospect of continuance, so that there is no likelihood of an immediate falling off in supply. The newly discovered Tasmanian tin mines must, if we are to believe the *Cornwall* (Tasmania) *Chronicle* of March 20, before long make itself felt on the London market. The clip is worth reprinting for the amount of information it contains, and I enclose it for that purpose, but your readers are to read it with a grain of salt. The Stanthorpe Smelting Works are now working steady, and turning out large quantities of ingots; the quality, I am informed, is very prime, and compares favourably

with the Sydney and Brisbane brand. In copper and other metals nothing doing, excepting gold. All the Reefing country is doing well, the late discoveries proving themselves rich beyond expectation.

Brisbane, April 23. RESIDENT.

OUR TIN MINES.—The Mount Bischoff Company is making great progress with their mining operations; the cost of cartage between the Mount and Emu Bay has been much reduced, and the Van Diemen's Land Company's agent is pushing on the work at the tramway between Emu Bay and Mount Bischoff very rapidly. The Waratah and other tin mining companies at Mount Bischoff will now be in a position to proceed with work at the various claims without fear of being mulcted in such heavy charges for carriage of machinery, stores, and provisions up, and tin ore back as the Mount Bischoff Company have had to pay. Work at their ably-managed smelting works in Launceston has been brisk, and two furnaces are now in full blast. Since Jan. 1 the company have shipped 110 tons of tin in ingots, and Mr. Jenkin, the manager, has now 24 tons in stock. The directors intend to ship 50 tons to Melbourne next week for transhipment to London. There is a sufficient stock of tin ore on hand to keep the two furnaces at work for some time, and fresh supplies are coming to hand almost daily. Numerous parcels of tin ore arrive weekly from Mount Bischoff, Mount Cameron, Kingarooma, and Scottsdale tin mines. On Feb. 25 the Mount Bischoff Company purchased at their smelting works the following quantities of tin ore, which arrived by the Coronella, Teazer, and Elizabeth on the 23rd ult.:—Tamar Company, 1 ton 12 cwts. 3 qrs. 2 lbs., assaying 73·5 per cent., at 45*l.* 1s. 5d. per ton; Victoria Company, 1 ton 1 cwt. 19 lbs., assaying 72·0 per cent., at 43*l.* 15s. 7d. per ton; Moore's claim, 13 cwts. 3 qrs. 8 lbs., assaying 73·4 per cent., at 45*l.* 0s. 4d. per ton; Garibaldi Company, 1 ton 19 cwts. 1 qr. 15 lbs., assaying 73·6 per cent., at 45*l.* 2s. 10d. per ton; A. Gill's claim, 1 ton 14 cwts. 27 lbs., assaying 73·2 per cent., at 44*l.* 17s. 11d. per ton; Pearce's Ruby Flat Company, 2 tons 6 cwts., assaying 73·6 per cent., at 45*l.* 2s. 10d. per ton; Standard Company, 1 ton 19 cwts. 2 qrs. 4 lbs., assaying 73·7 per cent., at 45*l.* 4s. per ton; Dorset Company, 1 ton 12 cwts. 3 qrs. 4 lbs., assaying 73·0 per cent., at 44*l.* 15s. 6d. per ton, 2 cwts. 2 qrs. 12 lbs. assaying 60 per cent., at 32*l.* 0s. 6d. per ton; Globe Company, 9 cwts. 1 qr. 27 lbs., assaying 73·1 per cent., at 44*l.* 6s. 8d. per ton; Golden Age Company, 1 ton 1 qr. 16 lbs., assaying 71·60 per cent., at 43*l.* 2s. 8d. per ton; H. Ritchie (agent), 6 cwts. 1 qr. 6 lbs., assaying 73·5 per cent., at 45*l.* 1s. 7d. per ton; A. Rankin, 1 ton 6 cwts. 3 qrs. 2 lbs., assaying 72 per cent., at 43*l.* 15s. 6d. per ton; W. Flexman (agent), 6 cwts. 3 qrs. 19 lbs., assaying 73·5 per cent., at 45*l.* 1s. 7d. per ton; Khruska and Co., 4 tons 8 cwts. 22 lbs., assaying 73·7 per cent., at 45*l.* 4s. per ton; Band of Hope Company, 1 ton 12 cwts. 1 qr. 22 lbs., assaying 73·4 per cent., at 45*l.* 0s. 5d. per ton; Star of Peace Company, 7 cwts. 11 lbs., assaying 73·5 per cent., at 45*l.* 1s. 7d. per ton; Prince of Wales Company, 7 cwts. 4 lbs., assaying 73·6 per cent., at 45*l.* 2s. 10d. per ton; Enterprise Company, 13 cwts. 2 qrs., assaying 73·0 per cent., at 44*l.* 15s. 6d. per ton; Irvine and McEachern (agents), 7 cwts. 2 qrs. 15 lbs., assaying 73·3 per cent., at 44*l.* 19s. 1d. per ton.

The Stanhope Tin Mining Company have, it is alleged, succeeded in smelting at their mine, Mount Bischoff, a quantity of tin ore with wood fuel, and they shipped from Emu Bay to Melbourne 10*l* of the first ingots thus turned out. It is stated that the manager of the Stanhope Smelting Works can smelt a ton of ore in eight hours, with 5 tons of green wood, at 4s. per ton, and that the company can smelt their ore at 3*l.* per ton. The truth of this, however, has been disputed. The ketch Coronella arrived at Launceston from Bridport on the 7th inst., with 374 bags of ore for the following companies:—Pearce's Ruby Flat Company, 45 bags; Krushka and Co., 45 bags; Globe Company, 33 bags; H. H. Gill's claim, 32 bags; Star of Peace Company, 45 bags; A. Gill's claim, 35 bags; City of Launceston Company, 27 bags; Band of Hope Company, 25 bags; Tamar Company, 21 bags; Thistle Company, 20 bags; Golden Age Company, 15 bags; Moore's Company, 12 bags; Dorset Company, 10 bags; and the Hit or Miss Company, 9 bags.

The Mount Bischoff Company have purchased the following quantities of tin ore which arrived by the Coronella last week:—

Company.	Weight. Tons c. qr lb.	Assay. Per cent.	Per ton.
Hit or Miss	0 6 3 14	73	£39 3 9
Golden Age	0 15 3 12	72	38 9 6
Khruska Company	2 4 0 0	73·5	39 9 1
Globe	1 5 0 17	73	39 3 9
Star of Peace	2 5 0 27	72	38 9 6
Moore's	0 11 2 16	72·1)	38 10 6
A. Gill's	1 13 3 2	73·3	39 7 0
Dorset	0 2 3 9	60	27 3 0
,,	0 7 1 5	73 1	39 4 9
City of Launceston	1 0 1 21	72·5	38 14 6
Thistle	1 0 1 14	72·5	39 9 0
Band of Hope	1 1 3 15	73·1	32 4 9

BORING MACHINES FOR MINES.

SIR,—Mr. George Rickard's reply to my remarks may be very satisfactory to himself, but to me they are decidedly puerile, and anything but flattering to the county, or to Cornishmen, whether considered in their relation to mining, or as a mere literary production. If no one else approve of his efforts he certainly holds them in high estimation himself. That may be evidence of something justifying the epithets which "Cornishman" in a letter preceding Mr. Rickards in the same issue applies to his fellow "Cornishman." However that may be, I pass on to say that I am no less interested in the successful introduction of boring machines to mines than either of those gentlemen. But what is the good of branding wholesale the whole county with ignorance and stupidity for failing in their efforts hitherto earnestly and honestly, as I think, exerted to adopt boring machines to the peculiarly variable ground of the deep Cornish tin mines. "Cornishman" states that the machines have been tried, and are now in successful operation at many places where the ground is precisely similar to that found in Cornwall. But will he on reflection undertake to affirm that that statement is true, and if he does, will he not fall under his own condemnation, and prove himself guilty of "ignorance and hot haste," which he so unsparingly visits upon his countrymen? What will he say about the tin capels of Cornwall, where has he seen out of the country works analogous to those? Has he seen the machines at work, or either of them at the several places of which he speaks? If he has, will he be good enough to give us a description of the ground upon which they were operating, and also what progress was being made, especially upon ground analogous in all respects to the tin capels of Cornwall?

It may amuse your correspondent to write vague generalities, but the numerous readers of your widely-circulating Journal require something more pointed and practical to satisfy them. It boots nothing to inform them that boring machines are successfully employed at many places; that really is no information, as everyone knows that, and has known it for a long time. Now comes the important question, "To what circumstances is the failure of rock-boring machines in Cornwall due?" The solution is at hand from "Cornishman's" point of view. He gives it thus—"chiefly to ignorance; want of analytical power"—whatever that may mean—"to distinguish one set of facts from another; and to the hot haste which ignorance ever makes to pass jungment upon, to condemn and to deny that which is not understood." I would like to ask "Cornishman," now that he has divested himself of this impertinent diatribe, whether it has not proceeded more from his own personal experience and feeling than from his observation of others; and if the ignorance he speaks of is not an integral element in his own constitution, and justly attributable to himself? He will find it something to do to prove that it is not. I wish him also to inform us what "analytical power" has to do with the working of rock-boring machines? What is there to analyse? Are analysis and synthesis indispensible preliminaries or concomitants to the successful boring by machinery? What have these mental operations to do with the mechanical action of rock boring machines? Is "Cornishman" an analyst himself; and if so—of what? If I were to analyse him, as by his letter, I might most successfully do. I shou'd probably set him down in the category which I sometimes see in newspapers headed, "Want places."

It is surprising that a light of so surpassing a brilliancy shining amid its surrounding darkness should still be invisible to all but itself, but perhaps it shines inwardly, and its lustre radiated inversely, from circumference to centre, so that only by the laboured action of speaking or writing can its corruscations be made to appear. It is strange also that the action of so much force and so much intelligence has failed to be recognised by anything but its own interpenetrating and unreflected light, and this especially when it is so generally understood that "actions speak louder than words." Further, I am afraid the advice he has given is equally applicable to himself as to others. He says, "Let Cornishmen, if they are in earnest, drop their plausible conceits, their overweening opinions of themselves, and get abroad in the world, and learn what is already accomplished in working ground by means of machinery." Could anything be more gratuitous and irrevelant, or betray greater ignorance, than such advice as this? Where is the place throughout the civilised world where mining is carried on and Cornish miners are not found there? And where is the place in Cornwall that does not number amongst its inhabitants many who have travelled and worked in other countries, men whose experience is as extensive and varied as that of your correspondent, "Cornishman?" If he is a Cornishman, I suspect he is, or was, an ambitious juvenile whom disappointments have made cynical. It is, no doubt, the sequel of of the self-estimated value of his own importance—made never to be realised—and founded on those conceits the discarding of which he so earnestly recommends to others. I would like to inform him, and with him Mr. George Rickard, that to be of any service to mining they must deal with practical facts instead of fanciful abstractions and hearsay results, which may be very imperfectly if at all consonant with the truth. It may be very much like Mr. Rickard's "crushing facts," which existed nowhere outside his imagination.

MINER.

EXPLOSIVES—DETONATORS.

SIR,—The Journal of last week tells us that Mr. W. H. Rule, merchant, of Camborne, was fined 10*l.* and 5*l.* costs, he having imported 96,000 detonating caps into the port of London without a special license to do so. Mr. Rule imagined that a duly authorised license for Cornwall would enable him to have the caps carried and delivered to him at Camborne, he paying the carriage and clearing at a Customs House. Such, however, is not the case. A license can be obtained by perseverance and after months of delay, as one importer in London has experienced. The license to import will cost 1*l.*, and must be renewed at the end of three months. The Home Secretary reserves the right to cancel such license at any moment he may think fit. Mr. Dupré, chemist to the Board of Trade, stated that the amount of explosive matter (fulminate of mercury and chlorate of potass) contained in the 96,000 caps was about 100 lbs.—a truly formidable amount if by any chance they were exploded in one heap, but harmless as percussion caps if not unnecessarily knocked about and fired. No instance is recorded of detonating caps exploding and doing any injury spontaneously or in course of transit; several accidents have occurred through children or adults inserting a nail, wire, or other hard substance in the attempt to scratch out the contents of the cap and see what it contained. Fingers have been cut off or so injured that amputation has been necessary. A strong detonator is indispensable for the quick firing of dynamite and guncotton. An ordinary fuse will probably fire dynamite or cause it to smoulder away, but the fumes arising from such combustion are incomparably more offensive than when dynamite is fired by a strong detonator. If we could have a detonator of double the power to the treble charge, there is no question the effect of the explosion would be greater and the quantity of injurious gases mitigated.

If the caps Mr. Rule has imported contain the explosive Mr. Dupré asserts, they are, without question, the strongest and best hitherto imported into Cornwall, and must benefit the miner and mines. The expenses and trouble of importation, to say nothing of the risk, will tend to maintain the excessive price of 35s. per thousand. Mr. Rule deserves credit for searching out and obtaining the best article direct from the manufacturer, instead of importing and supplying the miserable caps that have lately been sent round, and many of which, the miners say, will not fire at all without the assistance of gunpowder. How great, then, the risk to the men when the holes miss fire, the loss of dynamite, and loss of time. If Mr. Rule would go to Germany, and buy his dynamite direct from Krebbs Brothers, who are making both dynamite and lithofacture, and who have defied Nobel's patent, and intend to sell both mixtures in this country, we might have dynamite at 150*l.* per ton and he make his 15 per cent. by it. It is to be hoped Mr. Nobel's new explosive will shortly receive a trial in Cornwall; and if, as predicted for it, it be more powerful and less hurtful, its adoption is secured at a reasonable price.—*June* 27. CARNKIE.

RIVERS POLLUTION BILL.

SIR,—This Bill, introduced into Parliament by the so-called Conservative Government, seems to be framed in a very different spirit to that which actuated the legislators who passed the Waterworks Act, 10 Vict., c. 17, and the Nuisances Removal Act, 18 and 19 Vict., c. 121, both which contain clauses especially protective of the mining interests of the kingdom. The present Bill seems to be based on the assumption that the mining and other industrial pursuits of the country are less worthy the regard and protection of the law than the purity of the rivers which have time immemorial been the medium of conveyance to the ocean of the effluents from the works situated upon their banks. Such works, affording employment to a numerous population, and largely contributing to the national welfare, whilst the alleged impurities arising therefrom are in many cases not found to be injurious to health, though offensive to the angler, who delights in a clear stream, allowing the fish an uninterrupted sight of the fly intended either for its food or capture.

Upon a perusal of the Bill, it appears that in its preamble allusion is made to the prevention of the establishment of new sources of pollution, as if it had already been found that pre-existing sources had been attended with more grievance than benefit, and it had become needful to throw impediments in the way of future speculations. Then, as to the prohibition of putting solid matters into streams, in the main admittedly right, it may be open to consideration whether an exception ought to be made in favour of the rough cuttings or wastes (skimpings) arising from ore dressing, which do not muddy the water, and afford an excellent spawning bed for salmon, and in their onflow yield the sand so useful for admixture with lime for building the numerous erections in the lower course of the river.

And as to poisonous, noxious, or polluting liquids proceeding from mines, it has been ascertained, upon analysing the waters and sedimentary deposits, that the public impression as to what was thrown in is in a great measure erroneous, though from the report of the Commissioners of Enquiry into the best means for the prevention of the pollution of rivers, it seems they have arrived at different conclusions, and under their opinion of the character of the mining off-flows, they recommend the construction of threefold sedimentary pits, and the periodical removal of their contents to adjoining lands, but seem to have entirely overlooked the fact that such deposited material when dried in the sun and air may be carried by the winds on to the surrounding lands, and become a great grievance to the adjacent herbagers—in fact, create a new and greater evil than that they seek to remedy.

It may also be remarked that the sanitary authorities, to whom the Bill primarily commits the administration of remedial measures, being largely composed of country gentlemen, and others, to whom fishing is a recreation, and with a distaste to every source of muddying the streams affording them enjoyment, are not likely to look upon mining with favourable regard.

I beg to submit that this Bill needs the most careful consideration of the mining and other industries which may be affected by it, with a view to their protection from pending injustice and injury of the most serious nature. The present condition of these interests is not such as to admit of their being adversely interfered with.

A NORTHERN MINER.

CHANNEL TUNNEL.

SIR,—My letter upon this subject, from which you quoted, was written mainly to correct an error which had inadvertently crept into an able article in the *Leeds Mercury* in respect to the under-sea length of the proposed tunnel, and I only incidentally alluded to the question of the probable commercial results of the project. The letter of your correspondent in last week's Journal is quite in error in supposing that I possess any "special knowledge" upon a case which he admits has no parallel, and says—

"Can Mr. Firth point to any line of railway in England, France, Germany, or America which has two stations, making 300,000*l.* per annum profit upon the business done with each other, and with each other only? It is obvious that unless this can be shown the Channel Tunnel must prove a commercial failure, to that I hope Mr. Firth will give the evidence to support his views."

As I know of no such two stations as would comply with your correspondent's conditions, it is obvious that no "evidence" can be produced, but it does not in my opinion follow that, therefore, "the Channel tunnel must prove a commercial failure;" indeed, I have come to the opposite conclusion. Without discussing the question of the character of the involuntary labour by which the Suez canal was principally made, I am of opinion, should the grey chalk be found to be in the condition which is counted upon by the eminent men who are promoting the undertaking, the cost will not exceed 7,500,000*l.*, and not 10,000,000*l.*, as your correspondent names.

I estimate that 750,000 ordinary passengers, each making one double journey annually, would use the tunnel, and that an average fare of 2½*d.* per mile ought to be charged, the distance being 30 miles the fare for double journey would be 12s. 6d.; and assuming that ten coaches per train would carry 260 passengers, there would be 54s. 2d. per train mile.

Now, eight trains per day in each direction, carrying on the average 260 passengers by each train, at the rate named is 473,200*l.* per annum; and assuming that there will be in mails, excursion, and other extra traffic 26,800*l.* per annum, then the total passenger traffic would amount to 500,000*l.*; and estimating merchandise traffic of all kinds at 250,000*l.*, or half the passenger receipts, the gross income would be 750,000*l.* per annum. If the working expenses were taken at 60 per cent.—say, 450,000*l.*—then the residue is 300,000*l.*, which would give 4 per cent. dividend.

I cannot for a moment suppose that the passage under the sea will occupy more than 30 minutes, or that with so small a number of trains a good ventilation would be difficult indeed to be maintained. I am of opinion that the trains might be doubled in number without much, if any, inconvenience in that respect to passengers; and, therefore, there will be ample capacity for a large augmentation of traffic and dividend beyond the estimate that I have formed. I do not expect that your correspondent will concur in my views; but, as he has requested me to state them, he must take them only just for what they are worth. I have not access to the statistics of the promoters, but I feel no doubt but that the estimates now given would be fully borne out in practice. WILLIAM FIRTH.

THE SLATE TRADE.

SIR,—As your correspondent, in last week's Journal, wishes I forward a table showing the prices of slates, first quality, per thousand of the sizes most in request, and for a period of ten years. The prices are determined by the leading quarry proprietors or their agents at the commencement of each year. I am told there was a further advance this spring, but I do not know to what extent. Progressive prices indicate, of course, corresponding demands, and the slate-producing areas being practically limited it is difficult to foresee any diminution in the present demand, or that any equivalent will be adopted combining the lightness, durability, and inexpensiveness of the Welsh roofing slate.

Slate quarrying, from its nature, may be suspended without any pecuniary loss, and is, consequently, freer from the serious disadvantage of strikes or trades combinations than perhaps any other branch of British industry.—*June* 28. SUBSCRIBER.

PRICE PER THOUSAND (FIRST QUALITY).

Name.	1866.	1867.	1868.	1869.	1870.	1871.	1872	1873.	1874.	1875.
	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.	£. s. d.	£. s. d.	£. s. d.
Princesses*	11 0	11 0	11 0	11 0	11 0	11 5	11 5	11 5 0	12 5 0	13 10 0
Duchesses† ...	9 10	9 10	9 10	9 8	9 8	9 8	9 10	9 12 6	10 5 0	11 10 0
Lg. Countesses‡	6 10	6 15	6 15	6 15	6 15	6 15	6 15	6 10 0	6 10 0	7 15 0
Viscountesses§..	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5 0	5 10 0	6 7 6
Viscountesses‖..	4 0	4 ·	4 0	4 3	4 3	4 3	4 3	4 8 0	4 15 0	5 10 0
Short Ladies**.	2 5	2 5	2 5	2 2	2 2	2 3	2 5	2 5 0	2 12 6	3 0 0

*24 in. by 14 in.; †24 by 12; ‡20 by 10; §18 by 10; ‖18 by 9; **14 by 8.

CLEE HILL COLLIERY COMPANY.

SIR,—I hope the letter of "Shareholder" in last week's Journal may rouse the directors and induce them to break through the silence which they have for so long a period maintained towards their shareholders. The extraordinary conduct which has distinguished these gentlemen from the day they so disinterestedly and graciously condescended to take office in this promising venture is doubly objectionable, for not only is it extremely discourteous and unsatisfactory to the shareholders who subscribed the necessary capital to start and keep the concern going, but it has a pernicious effect upon the investing community at large, for it is generally in such undertakings that small capitalists (who figure largely amongst the speculators in mining property) begin their speculations, and when they are subjected to such discourtesy at the outset of their experience they naturally get disgusted, look upon mining with suspicion, and put their money elsewhere. Upon these latter grounds I think when directors so far forget their duty they should publicly be called to account through the medium of your valuable Journal.

The shares of this company are now being freely offered, without buyers, at 2s. each, and it is, therefore, time something was done to ascertain the real cause of such a state of affairs. If the directors persist in maintaining their uncommunicative attitude any longer the shareholders should insist upon a meeting, and see that one is held, which would give them an opportunity of making any such fresh arrangements as might be found necessary or desirable. Lastly, the meeting should be held at a place convenient to the majority of shareholders, and not away on the Clee Hills, which necessitates (as on the last occasion of a meeting) an omnibus ride of many miles over anything but a pleasant road. ANOTHER SHAREHOLDER.

London, June 27.

CORNWALL MINERALS RAILWAY.

Sir,—You have, no doubt, been informed that this railway was opened for passenger traffic a few days ago. It connects Fowey with New Quay for general traffic, but there are several branches used for goods only—china clay and stone, iron ore, &c. The quantity of china clay carried on it is very considerable, and is on the increase. The line is a very important addition to our conveniences, for the existence of which we are indebted in a large measure to Mr. Roebuck, who raised the money to execute the works. The capital exceeds a million sterling! It afforded me great pleasure to find that the wicked attempt to ruin that gentleman's character and fortune has been defeated, to the disgrace of the parties who persecuted him and put him to great expense in the defence of his position as an honourable man. R. SYMONS.

Truro, June 28.

MINING IN THE GWENNAP DISTRICT.

SIR,—Mr. Charles Bawden is a strenuous advocate for mining in Gwennap. As a proof of his zeal in the matter, numerous letters bearing his signature have from time to time appeared in the Journal. It is natural that he should desire to see a revival of the industry in his native parish, not only on his own account, but for the benefit also of his ex-parishioners. What a change has come over the parish since I knew it half-a-century ago! Then nearly every mine was at work; now only three or four, and those very small, are in activity. The Consolidated Mines, United Mines, Poldice, Wheal Maiden, Wheal Jewell, West Jewell, Wheal Pink, Wheal Garland, Wheal Unity, Wheal Unity Wood (old mine), Wheal Damsel, East Damsel, Carharrack, Wheal Friendship, Wheal Squire, Tingtang, Tresavean, Penstruthal, Treskerby, Wheal Chance, Wheal Buller and Beauchamp, and some smaller mines, have ceased to work, after giving very large profits to the shareholders. The profits on three of the mines named amounted to about 1,500,000*l.* sterling; very few of them, if any, deserve further trial, they are mostly worked out. But the parish, I doubt not, contains at the present time in its veins more wealth than has been extracted, and it is not at all improbable that in some future time there will be as much labour and profit as distinguished its former days. I would not advise the re-working of any of the old mines, except Tingtang, but I think that in the virgin ground there are numerous untried lodes which should be opened, and which could be done at little cost. No doubt by doing this valuable discoveries would be made, and lead to extensive mining in this now almost deserted parish.

The *Mining Journal* of last week contains the prospectus of a projected mine called "The Silver Hill Copper Mine," said to be in the Gwennap district. I am intimately acquainted with Gwennap, but I do not know where that mine is. It is, for a mine in Gwennap, a new name, but the prospectus should state where the mine is situate in the district. What is the name of the land? What are the contiguous or surrounding mines? I disapprove of indefinite statements; the advertiser need not, I suppose, fear to name the estate. The parish has a good character for mineral production, which it is not likely soon to lose.

I am much pleased to hear that West Poldice is prosperous. I believe that Cathedral and Penstruthal are also looking well. There

are not so many unoccupied houses in Gwennap as one would suppose, there are comparatively few. The men have left their wives in possession, while they work elsewhere. Gwennap is not singular as to mine abandonment; Breage, Gwinear, Crowan, St. Hilary, and St. Agnes are in similar circumstances. R. SYMONS.

Truro, June 27.

WHEAL PEEVOR, AND ITS MANAGEMENT.

SIR,—In the Journal of last Saturday I observe a letter from your wordy correspondent, Capt. Abraham James, the late manager of this mine, but as usual he makes statements which, according to his fertile imagination, he calls "facts." I have, however, no time for newspaper writing, but in justice to myself feel bound to reply to a few of his remarks. In the first place I may state that during the last four months of Capt. James's management about 42 tons of tin were sold, whilst for the four months after his leaving the mine about 62 tons of tin were sold. This increase was not caused, however, by any great improvement in the mine, but was principally effected by a radical change in the discharge of our stuff. Apart from this, not an ounce of tin was broken from the shaft for upwards of six weeks, where 12 men were employed. Your correspondent states that during his last 16 weeks working the water was in the bottom of the mine for several weeks, but to this I give the most unqualified contradiction; the fact is, the water was only in the bottom of the mine for a few hours to connect the rods, and in another instance for a short time to repair a breakage to the main loops of the angle bob. This, however, would never have occurred had Capt. James taken the advice of myself and others. Again, your correspondent goes into ecstacies over the cost of wire-ropes, extra pitwork, &c., had by him, but this is, as usual, greatly exaggerated. How is it that the January bills (when he had no extras to complain of) were so heavy in comparison to the subsequent months which were under my charge? In conclusion, I beg to say we have had no let or hindrance in the development of the mine since the departure of our late opinionated manager, and I am pleased to say that in spite of his deeply rooted prejudices we are opening up a good mine, and that we shall, I think, overcome all our difficulties, and ultimately reward the shareholders for their perseverance.

Redruth, June 27. W. T. WHITE, Manager.

WHEAL GRENVILLE, AND ITS MANAGEMENT.

SIR,—Since my letter to you of June 21 I have seen Capt. Hodge's report that was presented at the late general meeting, and a more unsatisfactory and discouraging statement of affairs, after Mr. Lane's promises, I never read. If there be no better immediate prospect than Capt. Hodge represents, I consider that the sooner the shareholders make up their minds to pay no more calls, but to wind-up the company, the better. I see there are five ends driving in the mine by 14 men, whilst there are 40 men stoping, and 24 men on tribute. The 160 west, or bottom level, is being driven by *two* men, at 14*l.* per fathom; lode worth 6*l.* per fathom. The 160 east, by four men, at 16*l.* per fathom; lode worth 7*l.* per fathom. The 150 east, where Capt. Hodge says the lode is showing a good appearance, is also being driven by *two* men, and at 8*l.* 10s. per fathom. In the other two ends there are four and two men respectively. And this, Mr. Editor, is Mr. F. G. Lane's system of working Wheal Grenville. This is his *increasing the producing power of the mine, and reducing surface expenditure.* And look you in a mine, too, where, according to the Chairman's statement, reported by you as made at the general meeting on March 23, "*there are thousands or tens of thousands of tons of ore left by the former management.*" Altogether there are 78 men working underground. The costs of the mine for three months amount to 2716*l.* The merchants' bills are enormous in proportion to the amount of labour employed underground; their amount for the three months is 1202*l.*, and the labour costs 1514*l.* only. At the last general meeting of the shareholders, held during the late management, there were 100 men at work underground. The costs for three months were 2833*l.*, and of this amount 1773*l.* were for labour costs, and 1060*l.* for merchants' bills. Therefore, in proportion to the number of men employed, the costs of the late management were considerably lower than those of the present. In his first "agitation" circular, dated Oct. 23, 1875, Mr. Lane made the following remarks:—

> It has been proved that the expenses of working and management are extravagant compared with the returns. * * * * *I believe we have a fine property, but I do believe it is mismanaged, and it is the duty of the shareholders to seriously consider the position of affairs.* How is it possible with such a small amount of producing expenditure underground we can expect to meet such an enormous surface cost, and make a profit?"

Anyone who possesses a copy of Mr. Lane's Circular can in a moment satisfy himself as to the correctness of my quotations. I will ask if I have not, by a simple array of facts, shown that Mr. Lane's statements in October last were not justified, and that they may now be aptly applied to the state of affairs under his own management? The second remark of Mr. Lane's, and which I have *italicised*, is singularly appropriate to the present management.

Captain Hodge advises a cross-cut being driven south from the western shaft. If I were the manager and wanted to drown the mine I should recommend this cross-cut. Why, Mr. Editor, the water is now so strong in this shaft that it is impossible to sink; and whenever the engine has been idle for a few hours the water has risen to such an extent that it has taken days to drain the shaft again, and yet Capt. Hodge advises a speculative cross-cut which, should it lead to an increase of water, would assuredly drown this part of the mine. Now, with regard to the erection of another pumping engine, Capt. Hodge does not say where he would place it. Surely not at the western shaft. If the bottom levels are not worth driving by more than eight men for three ends, what inducement is there for the erection of an engine to open new ground in depth? The shaft is about 2 fms. below the 160, and in the junction of the South Condurrow and old lodes. In 3 or 4 fms. further sinking the shaft will have passed through the lodes, and suppose the tin found *at* the junction does not hold down *under* the junction? There was a good pipe of tin from the 160 to the 130, but Capt. Hodge knows as well as I do that it did not hold far east or west of the shaft, and no prudent man would erect an engine at this point upon such doubtful prospects. Would Capt. Hodge put the engine at the north shaft, where the lode has just been cut at the 140, and containing, so we are informed, "slabs of tin?" Not *Dutch* slabs, understand, Mr. Editor. The South Condurrow shareholders would no doubt rejoice to see an engine erected there close to their mine, as it would greatly decrease their water charges, at a serious increase of expense to the Wheal Grenville Company. Indeed, in my opinion the present system of operations upon this lode is far more to the benefit of South Condurrow than it will ever be to the Wheal Grenville Company. Where, then, would Capt. Hodge place the engine? He is undoubtedly right in saying that the present engine is hardly competent to keep the mine in fork, and I have before pointed out the danger in this respect. It is a matter of surprise to me that a serious accident has not occurred before this. Capt. Hodge will not, I am sure, refuse to admit that such a very possible event would, even if it brought about nothing worse, entail a very serious expense to the company. What, then, ought to be done? In the answer to that question rests the future of Wheal Grenville. It would appear, Mr. Editor, as if the committee's sole object is to make expenditure and receipts balance at any risk, if only for the purpose of showing the shareholders that they have done that which the old managers could not accomplish. But without some great and unexpected discovery in the mine will they ever do it? I have not the slightest doubt in the matter. Mr. Editor, I believe there is yet a fair future for Wheal Grenville under proper management.

From the commencement of Mr. Lane's agitation I felt certain that his move, if successful, would result in disappointment and disaster to the company. Mr. Lane showed such ignorance of the mine one could clearly foresee that his promises would end in a miserable failure. The former management had had years of experience of the mine. They could not, more than other men, find tin where Nature had not placed it, but they worked the mine with judgment, and did their best for the general interests of the adventurers, and when those adventurers foolishly allowed themselves to be led by Mr. Lane to believe that he knew and could manage the property better than the agents were working it, men of judgment and common-sense down here saw that a lamentable mistake had been made, a great delusion practised, and a still greater wrong inflicted. The shareholders may just now refuse to recognise this most palpable fact, and for awhile longer may continue to listen to and support Mr. Lane and his fellow-managers, but I feel assured, Mr. Editor, that the truth will eventually make itself felt, and with tenfold greater force for its prolonged acknowledgment.

Camborne, June 28. F. L. A. T. RODDA.

CARDIGANSHIRE MINES, NEW AND OLD—No. VIII.

SIR,—Continuing the subject of the mines now undergoing liquidation in this county, I intend offering this week a few remarks on the Bwadrain Mine, from which a large quantity of lead ore has been returned from the ground that has been taken away. The mine has been sunk from surface to a depth of about 60 fms., and has been drained by machinery erected in the valley of the Rheidol, drawing a long, heavy, and cumbersome line of rods over one of the stiffest mountains in this district. There not having been a sufficient quantity of surface water on the top of the hill for crushing, drawing, and dressing, the machinery in the valley has been made to assist this work also, by plunging the water over them, but it has been generally short in summer and badly situated in winter. The Gellirein, a sett adjoining this, and to the west of it, has a deep level driven up to within a short distance of the Bwadrain Mine, and by continuing this adit into the Bwadrain Mine all the way on the course of the lode there would be fair chances of finding fresh courses of ore, whilst the courses of ore at Bwadrain would not only be unwatered, but would leave a back of from 30 to 40 fms. for stoping away, and as the Gellirein could have been, and can now doubtless be, had for a very small sum, the two mines should be thrown together, and the machinery removed to the mouth of Gellirein deep level, where the ore should be crushed and made marketable. If this plan were adopted, these mines would long since have been paying handsome dividends, instead of being wound-up as they are at present. When we see these things we can only regret it, and point them out with a hope that properties of this kind may not be allowed to remain unwrought for any length of time, as they can so easily be made a source of great good to the miners, the landowners, and also to the shareholders. ABSALOM FRANCIS.

Goginan, Aberystwith, June 27.

UNWROUGHT MINING GROUND IN CORNWALL.

SIR,—For the last 20 years comparatively little has been done towards the development of new or unwrought mining ground in the county, hence the absence of discoveries of much value to the shareholders, but there still remains an inexhaustible field of mineral wealth requiring only the operations of the miner to unfold riches equal in magnitude to any yet found, and it is with this view that I have selected sections of ground for the purpose of opening what will eventually verify the assertion. Starting from the foot of the Carn Marth range of granite on a line east and parallel to the rich copper mines of Gwennap, may be seen elvans of a highly crystalline nature in close connection with copper lodes, on the backs of which specimens of gossan containing large quantities of pyrites may be seen, equal in quality and closely resembling the ferruginous masses found in the Clifford Amalgamated which led to such rich deposits of copper, and bearing in mind that such indications are sure precursors of something valuable, I am led to believe that at Silver Hill Mine on the required small outlay being properly directed, results equal to those of neighbouring mines may be calculated on. Such gossans, containing as they do particles of black oxide of copper in combination with sulphur or arsenic, are never known to fail, as in the case of Devon Great Consols, which led to a division of profits of about 1,500,000*l.* sterling. Wheal Buller, Tresavean, Penstruthal, and others in a line with this mine had similar masses near the surface, which on being sunk on opened up as rich mines as have ever been formed in the county, and analogy points to like results in Silver Hill Mine.

St. Day, Scorrier, Cornwall, June 28. CHAS. BAWDEN.

COURT GRANGE LEAD MINING COMPANY.

SIR,—The complaint of a "Shareholder," in last week's Journal, as to the violation of the Companies Act by the Clee Hill Colliery Company in not convening an annual meeting of the shareholders, is one that equally applies to Court Grange, as it will soon be two years since the officials of this company condescended to take the shareholders into their confidence by calling them together and laying before them a statement of the company's financial position. And what has been done with the funds that were said (at the last meeting that was held) to be available for the development of the mines, the writer has not been able to ascertain; but I presume they have been expended in the orthodox mining fashion (although I am told no work has been going on at the mines during the last twelve months), and when all is spent we shall doubtless be convened together to consider the best method for raising more capital. Some officials do not care to meet their shareholders too often, and look upon annual meetings even as a superfluity, considering that they are within the four corners of the Companies Act if they hold a meeting once in every year, and state that if they convene a meeting—say, for Jan. 1, 1875—they could defy the shareholders until Dec. 31, 1876, which is two years; and they affirm this is in accordance with the Companies Act, which requires a meeting to be held yearly. To my mind, such proceedings are a gross violation of the Act of Parliament; and if a few of the officials who neglect to comply with the requirements of the Act of Parliament in this respect were summoned before the magistrates, it would be conferring a benefit upon the investing public.—*July 29.* DISSATISFIED SHAREHOLDER.

GLENROY—SHARE DEALING.

SIR,—Of all the incongruities of sharedealing the transactions in the above mine seem to me about the most conspicuous. We are informed by the reports of Capt. Rowe (a gentleman who from his long experience and association with the Great Laxey Mine ought to be, and no doubt is, thoroughly qualified to give most reliable information on matters appertaining to mining, and of the district in which Glenroy is located in particular) that the lode has been cut at three different and distinct points, each point valued at 80*l.* per fathom, making an aggregate of 240*l.* per fathom, and yet the shares are quoted at a most remarkably low figure. When I compare the indications shown and discoveries made in Glenroy (as represented by Capt. Rowe) with the present appearance of the adjoining mine of Great Laxey, and the number of shares and subscribed capital of each, I am astonished that Glenroy should remain so much in the shade. It seems positively ridiculous that a mine with prospects so brilliant as those of Glenroy should be selling at such a low market value. Can any of your readers explain the reason? I confess I am quite in a mist on the subject, and should be glad to have it cleared. My knowledge and experience of mining matters are but limited, yet it certainly appears to me that Glenroys ought to be now selling at a very much higher price than they are. If the above will elicit any further information in relation to this mine and its value I shall be glad.—*June 28.* INQUIRER.

[For remainder of Original Correspondence, see to-day's Journal.]

COAL AND IRON IN THE UNITED STATES.—The production of anthracite coal in Pennsylvania to May 27 this year amounted to 6,073,774 tons. The production of bituminous coal in Pennsylvania in the same period was 1,278,612 tons, making an aggregate of 7,352,386 tons. The corresponding production in the corresponding period of 1875 was as follows:—Anthracite, 5,003,399 tons; bituminous, 1,243,093 tons; making an aggregate of 6,246,492 tons. These figures show an increase of 1,070,375 tons in the production of anthracite, and of 35,519 tons in the production of bituminous coal, making the total increase in the production to May 27 this year 1,105,895 tons. There has been some little movement in the Pennsylvanian iron trade, a few additional furnaces have been brought into operation here and there, and some little increase is noticed in current orders. The Chicago, Burlington, and Quincy Railroad Company last year steel railed 102½ miles of its systems. At the close of 1875 the company had altogether steel railed 389 miles of its lines. The expenditure made by the company last year in the matter of steel rails amounted to no less than $851,000.

EXPORTS OF COAL.—By the Monthly Circular of Messrs. Higginson, of Liverpool, we learn the quantity of coal exported in May was 1,376,557 tons, against 1,146,381 tons in the corresponding month of 1875, showing an increase of 230,176 tons. The particulars are—From the Northern Ports, 680,199 tons; Yorkshire, 66,403 tons; London, 7568 tons; Liverpool, 57,872 tons; Severn Ports, 413,328 tons; and Scotch Ports, 151,187 tons. The increase was—Northern Ports, 56,028 tons; London, 1008 tons; Liverpool, 5165 tons; Severn Ports, 184,327 tons. The decrease—Yorkshire, 2944 tons; Scotch Ports, 13,408 tons. Total, Jan. to May, 1876, 5,444,349 tons; Jan. to May, 1875, 4,483,232 tons: increase, 961,117 tons.

POCKET ELECTRIC FIRE-BRICK.—An ingenious electric apparatus for producing fire and light, and designed to be carried in the pocket, has been invented by Mr. C. L. VAN TENAC, of Paris. He explains that the main object of the invention is a novel electrical apparatus of small size, completely hermetic and portable, and whose object is the production of fire or light at the will of the person employing the same. It may also be constructed for giving electric sparks at great distances, or for medical, scientific, or manufacturing purposes, and he terms it a pocket fire-brick or electric fire.

Meetings of Public Companies.

ST. JOHN DEL REY MINING COMPANY.

The ordinary general meeting of shareholders was held at the Cannon-street Hotel on Wednesday,

Mr. JOHN HOCKIN in the chair.

The notice convening the meeting and the minutes of the preceding one were confirmed, and the report, of which the subjoined is an abstract, was taken as read:—

Throughout the year the work of extracting the mineral from the mine has been actively and successfully prosecuted, uninterrupted by any casualty of a serious character, though not exempt from minor casualties, causing temporary inconvenience. The results, as will be seen hereafter, have been highly satisfactory. The produce of gold at Morro Velho from April 10, 1875, to April 8, 1876, both days inclusive, was 616,519·2 oits.=71,074·527 ozs. troy. The produce for the corresponding period of last year was 361,400·8 oits., or 41,663·576 ozs. troy. For 1866 7, the most successful of any previous year, the produce was 622,129 oits., or 71,721·357 ozs. troy. The net profit on the working of the mine for the year has been 163,567*l.* 6s. 6d. The interest that has accrued on funds in hand, and the amount received for transfer and other fees, have been 1603*l.* 12s. 9d. The amount of net profit brought from last year has been 3699*l.* 6s. 9d.; available profit, 164,87.*l.* 6s. Out of which there has been paid dividend at Christmas, 25 per cent. for the half-year, and 11,325*l.* carried to the reserve fund—74,575*l.* The general expenses during the year, 2495*l.* 10s.; due for income tax this and last years, 1240*l.*; testimonials voted at last meeting, and directors' percentage on profits, 2984*l.*: total, 81,274*l.* 10s. Leaving an available profit on May 31 of 87,597*l.* 16s. Out of which the directors have now the satisfaction of recommending a dividend of 25 per cent. on the capital of the company, free of income tax, being at the rate of 50 per cent. per annum, which, with the usual 10 per cent to the reserve fund, will absorb 69,575*l.*, and leave to be carried forward 18,014*l.* 13s.

The quantity of mineral raised from the mine, and the quantity of ore stamped during the last two years, and the two years preceding the fire, is shown in the following table:—

	1875 6. April 1 to March 31.	1874-5. April 1 to March 31.	1867. Jan. 1 to Nov. 21.	1866. Jan. 1 to Dec 31.
Mineral raised .....Tons	65,194	40,226	98 905	107,087
Ore stamped	64,061	40,646	78,886	60,698

These figures show, as might be expected, a very satisfactory increase in the output during the year now under consideration, as compared with the preceding year, during the early part of which the mine was only very partially opened out. They also show that whereas since the new mine has been opened the whole of the mineral quarried has been ore of good quality (in the current year 235 tons of killas—unproductive slate rock—only were rejected, the further difference between the quantity raised and stamped was stock at surface unstamped and lode-stone used for grinders in the arrastras), whereas previously to the fire a very large proportion of the mineral quarried was worthless.

In their last annual report the directors remarked that the loss of the year was "the smallest loss of gold per ton ever sustained by the company." They were not, however, at the time confident that the figures correctly represented the actual loss of gold per ton, for past experience has shown that the loss per ton is to some extent in proportion to the gold contents of the mineral operated on. For instance, in 1867, before the fire, when the average gold contents of the mineral were 10·125 oits., or 1·167 ozs. troy, the loss (after careful adjustment of the mode of measuring or computing the weight of the mineral) was reported as 2·314 oits., or ·266 ozs. troy per ton, by assay of head sand (mineral as received from the mine after pulverisation), and 3·463 oits., or ·399 ozs. troy per ton by assay of residuary sand; immediately after the fire, however, the gold contents of the mineral treated fell to an average for the year 1868 of 2·642 oits per ton, and the loss was reported as 1·103 oits., or ·130 oz., troy per ton by assay of the head sand, and 1·140 oits., or ·131 oz. troy, by assay of the residuary sand, and it continued to be reported at about that rate during the whole of the time that low-class ore was being operated on. A mean loss, therefore, of ·969 oits., or ·111 oz. troy per ton, when the average gold contents of the head sand, as sampled and assayed, was 9·490 oits., or 1·095 oz., troy per ton, seemed inconsistent with past experience, and pointed either to vastly improved treatment or some defect in making the return. The board accordingly directed that duplicates of the samples assayed at Morro Velho be sent to this country for assay. The samples for six months of the current year have now been received and assayed, and the assays in London show a loss of about twice that returned as the loss at Morro Velho.

On consulting with a firm of high repute in London as assayists, it was found that in one or two points the mode of making the assays hitherto at Morro Velho was defective. Instructions were, therefore, obtained from them and forwarded to the mines. The loss ascertained by assays made under these instructions for March and April is more in accordance with the results obtained in England. Under these circumstances, therefore, the directors have arrived at the opinion that the loss for the year now under consideration cannot be less than from 2·5 or 3 oits., or from ·288 to ·342 oz. troy per ton. They are taking, and will continue to take, steps which they hope may lead to a more perfect knowledge of the actual loss the company is sustaining, and to reduce that loss to a minimum.

A very great economy of labour has been effected in the mining works. The following table shows the quantity of mineral stamped, the produce obtained, in sterling, and the cost and profit for the last two years, and for the two years preceding the fire:—

Year ending February or March.	Tons stamped.	Produce. £.	Cost. £.	Profit. £.
1876	64,061	247,820	84,253	163, 67
1875	40,646	144,076	6 ,8 4	83,241
1867	81,212	243,923	134,516	109,407
1866	59,7 1	204,717	124, 78	80,438

From the figures given in the report some interesting and satisfactory facts are apparent on comparing the results of the past year and those of 1867 and 1866—1. The produce obtained in the year ending February, 1867, was 5610 oits., or 646¾ ozs. Troy, more than in the year ending March last. The proceeds in sterling are, nevertheless, 3837*l.* more in 1876 for the smaller quantity than in 1867 for the larger. This arises from an improvement in the ley or standard of the metal in the present workings, as compared with the old mine.—2. The quantity of ore stamped and the proceeds thereof have been larger during the past year than in 1867, yet the force employed to produce this result numbered 1294 in the year just past, and 2512 in 1867. The causes of these improved results are various. The existing excavation is small in comparison with the former, and requires comparatively little labour to keep its timber and pumpwork in a state of efficiency. The arrangements for hauling and conveying the ore to the floors are simple, and machinery has been substituted for hand labour in the latter. Only good ore has been quarried, whereas in 1867 some 45,000 tons of inferior or worthless mineral had to be quarried and brought to the surface, and by substituting dynamite for gunpowder more duty has been performed per man. The effect is seen in a diminished cost of some 50,000*l.*, and an increased profit of about the same amount.

The superintendent, Mr. J. N. Gordon, left England to resume his duties on April 10, and arrived at Morro Velho on May 15. His report on his return, after an absence of twelve months, is also annexed hereto. The directors much regret to have to report the loss of the company's engineer, Mr. James Muter Anderson Gordon, who was accidentally killed while in the execution of his duty in June last. Mr. Gordon was so valued an officer that they have caused a tomb and tablet to be erected to his memory. The following is the financial position of the company:—

In England—				
Cash at Messrs. Williams, Deacon, and Co...	£ 1,328	9	3	
Ditto, on deposit at interest with ditto	14,500	0	0	
Ditto, ditto, with United Discount Corporation (Limited) against securities lodged with the company	68,000	0	0 =	£83,828 9 3
To pay—				
Drafts running due, June, 7000*l.*; July, 6000*l.*; August, 7000*l.* = ...	20,000	0	0	
Dividend to be proposed	63,250	0	0	
Ten per cent. thereon	6,325	0	0 =	89,575 0 0
A further remittance is due in July.				
Investments, on account of profits realised—				
5500*l.* Great Western Railway 4 and 4½ per cent. debenture stock, cost 6443*l.* 16s. 9d.; 4780*l.* North British 4 per cent. debenture stock, cost 4851*l.* 19s. = ...				11,196 15 9
On account of capital—				
11,700*l.* South Eastern Railway 5 per cent. debenture stock				14,007 5 0
The reserved fund at present consists of—				
800*l.* South Eastern 5 per cent. deb. stock, cost 1004*l.* 2s. 6d.; 3555*l.* Great Eastern ditto 4297*l.* 3s. 9d.; 4 50*l.* London and Brighton 4½ per cent. ditto, 5058*l.* 15s. 6d.; 1950*l.* Caledonian 4 per cent. ditto, 6106*l.* 19s. 6d.; 5000*l.* North Staffordshire 4½ per cent. ditto, 5313*l.* 19s. = ...				21,721 0 3
The reserved fund on May 31, 1875, was	£ 4,912	4	4	
Added June, 1875	5,069	0	0	
Ditto, December, 1875	11,325	0	0	
Interest during the year	406	19	1	
Over invested.....	16	16	10	
Amount of investments.....				21,721 0 3
Reserved fund interest account—				
One year's interest on 2980*l.* Great Eastern debenture bonds, 147*l.* 15s. 2d.; one year's interest on 800*l.* South Eastern ditto, 39*l.* 13s. 4d.; half year's interest on 4560*l.* London and Brighton ditto, 101*l.* 10s. 5d.; half year's interest on 5950*l.* Caledonian Railway ditto, 118*l.* 0s. 2d. = ...				406 19 1
In Brazil—				
Cash at Morro Velho	£ 2,134	7	8	
P. S. Nicolson and Co., Rio de Janeiro, bills on London	8,000	0	0	
Bills receivable, Rio de Janeiro	2,347	6	8 =	12,481 14 4
To pay—				
P. S. Nicolson and Co., Rio de Janeiro	3,342	8	8	
Other liabilities in Brazil	4,975	6	11 =	8,317 15 7

The CHAIRMAN said: This report, you will have seen, brings the information from the mines as received by letter up to March 31, but we are in possession of much later information, both by letter and telegram, than the report contains. I will, therefore, following my usual practice, state the produce, yield, and profit reported for the months of April, May, and to June 8—two months later than the report records. The average monthly produce for the year is 51,376 oitavas, and the average yield is 9·6 oits. per ton. The produce for April, by written report, was 40,999 oits.; for May, by telegram, 43 000 oits.; and for eight days of June 12,250 oits., or at the rate of 45,930 oits. for the month of 30 days. The yield was 8·0 oits. per ton for April, 7·8 for May, and 9·6 for eight days in

June. These figures show a diminished produce and yield for this period, and you will no doubt expect me to inform you of the cause of such a falling off. As regards April, we have the explanation by the last mail in the following words:—"The above produce shows a considerable falling off as compared with that of the previous month, and which was caused by a larger proportion of killas and inferior qualitities of stone being mixed with it, as well as a smaller quantity of the general mineral treated during the month;" and the mine captain reports as the cause of the larger proportion of killas having been quarried as follows:—"We have been uncovering the lode in the B excavation, and we have also taken up a new stope in the western part of the A excavation, where the intrusion of killas exists, and consequently have been under the necessity of sending to the surface a large quantity of inferior stone, which has considerably lowered the standard of the mineral treated. As regards the still low, though slightly improved, produce for May, we have no written explanation except that Mr. Gorden, writing on May 19, also attributes it to inferior stone, which it is necessary for the proper working of the mine should be removed. The profit, of course, follows the produce. On the realisation of the gold for these two months the net profit will, I expect, be about 20,000*l.* As regards the profits for the year, which I am sure you will all think most satisfactory, I may remark that if anyone has taken the trouble to compare the same with the amount shown in the monthly estimates sent from Morro Velho, they will find that it exceeds that sum by 7717*l.* The principal cause of this is the late improved ley or standard of the gold, as referred to the report. We prudently estimate the gold, so as to be on the safe side, at 7s. 9d. the oitava, but of late it has been realising over 8s. 1d. per oitava. This, and some little difference in the cost, as made up on this and the other side, accounts for the whole difference I have named. As regards the size of the excavation opened out, and the probable further extent of ore ground, these are very clearly shown in the very neatly executed map just received from the mine, and referred to by Mr. Gordon in his general observations, and of which several lithographed copies are in the room. These, you will see, give information as to the probable further extent of ore ground, and which we had not received when the plans you are in possession of were printed; thus, for instance, you will see that here, on the eastern end of the mine, the whole of the space lying between these two lines—*i.e.*, between the part worked out, coloured blue, and this green line, is ascertained, as certainly as it is possible to ascertain from workings above, to be good ore. On the western side our knowledge is less perfect, but on the trial level, which is shown here, we have passed through some fathoms of good ore. If any shareholder wishes these additional lines marked on the plan No. 2 he has, we shall be happy to have it done if he will forward it to the company's office. In the mine captain's report (appendix, page 1) there is an expression which, if taken by itself, would lead to the conclusion that the lode at the sump is increasing as we descend, but a glance at the plan will show you that whilst the dip of the lode is given as at the angle of 40° the shaft is being carried down at an angle of 45°, so that the shaft is gradually getting into the wider part of the excavation, leaving a greater length of lode east of it as it descends. The question whether it would not be wise to alter the direction of the shaft to the same angle as the lode is under consideration. At pages 13 and 14 of the report some interesting figures are given and facts stated for the purpose of comparing the cost of working the present mine and the more extensive, but less compact, mine of 1867. The saving of labour in working the present mine is an advantage in the present state of the labour market in Brazil, the value of which can hardly be estimated. The directors are most anxious to effect further economy of labour in both the mine and reduction departments by introducing more labour saving machinery. They sent out last year a second Blake's stone-breaker, which they hope will be shortly erected, and when it is we hope the two machines we shall then have at work will be equal to breaking the whole of the stone quarried in the mine. Boring machinery is on the mine erected and ready to be tried when it can be judiciously done under superintendence likely to give it a fair trial. The increased duty performed by blasting by dynamite as compared with gunpowder is referred to in the report. Our now lengthened experience in the use of this most effective explosive enables us to speak authoritatively on this matter, and I can say that it is now proved beyond a doubt that in this company's mines not only is dynamite found to be more effective, but it is also more economical. Formerly we made our own gunpowder, and consequently saved the freight, duty, and inland carriage of one of its component parts—charcoal. Now we have to send out the dynamite, and pay the freight, duty, and carriage on the whole bulk, yet, and notwithstanding the greater first cost of the dynamite, we are saving some 2000*l.* a-year by its use. The figures have been gone into closely, and I find the extra cost of dynamite as compared with gunpowder is 9*l.* a-month, but the saving in labour is 272*l.* a month, a difference in favour of dynamite of 181*l.* per month, or 2172*l.* per annum. As regards its transport, we have no difficulty in obtaining ships to carry it at the same freight as gunpowder, or in inland carriage, 300 miles by rail as far as the railroad goes, then by wagons, and lastly on mules' backs, and without a single accident during the seven years we have now been carrying it. I need hardly say that I am in no way interested in the sale of dynamite, as a shareholder or otherwise, I mention these circumstances to show that we are alive to your interest, and never lose an opportunity to take advantage of improvements which science or ingenuity are constantly discovering for the benefit of the miner, as soon as we feel sure that doing so will save your pockets. In regard to an increase in the water-power, the plan for the reservoir, referred to in the report, is on the table. A dam 101 feet long and 70 feet high would form a reservoir nearly circular of about 300 yards in diameter, and would contain 100,000,000 gallons of water, or allowing for evaporation and leakage might be taken at 80,000,000 gallons. If the dam be made 100 feet high the contents would be more than double, or after allowing for evaporation and leakage 193,000,000 gallons. It is calculated that the smaller reservoir would contain 6¾ days full supply, and the large about 16 days full supply; and supposing the supply from the ordinary sources to fall off one third, the smaller reservoir would make up the deficiency for 20 days, and the larger for 48 days. This would be a great help at the height of the dry season, and we, therefore, hope the work has been set about. The cost of the larger is roughly estimated by the engineer at 6000*l.* We do not expect the plans and estimates for the leat from the Mucacos river for some three months, but we learn that the survey is over a length of 21½ miles, which seems rather formidable. As regards the financial position of the company, you will see that we have cash in London and invested on account of realised profits 95,000*l.*, whereas our total liabilities up to the end of August are only 89,000*l.*, with a further remittance of gold of some 35 000*l.* during next month. And we have invested in first class securities 21,721*l.* on account of reserve fund, and 14,000*l.* on account of unexpended capital, making together 35,000*l.* available for any contingency, to which there has now to be added 6325*l.*; and we hope before we conclude our proceedings an additional 5000*l.*, as at Christmas last, which will bring up the total amount available to the respectable though still insufficient sum, looking at the magnitude of our operations, of 46 000*l.* At our last meeting I said, "In no company has the importunce of having a strong reserve been more forceably demonstrated than in this, and it would be indeed very shortsighted policy not to take advantage of our present financial position to build up the reserve." This cannot be too strongly urged, and I hope the resolution we have prepared, and which will be proposed to the meeting after the resolution declaring a dividend has been passed, for carrying 5000*l.* additional to the reserve fund out of the balance of 18,014*l.* will be carried with the same unanimity as at our last meeting; we shall then carry forward the sum of 13,000*l.* to next year's account. I have now touched on most of the points of interest in the report, and given as much information regarding the past year's operations as occurs to me may be interesting, but as possibly gentlemen present may desire information on further matters I hope they will not scruple to ask for it, for it is our desire at these meetings to impart to the shareholders all the knowledge we possess of the company's property and the proceedings at the mines. I may mention that since the report has been in the hands o the shareholders I have received a letter from Mr. Gordon pointing out that in the sentence immediately following the word "conclusion," at the end of his general observations, he had intended to quote the whole sentence in his last year's report, but that the copying clerk copied too literally his rough copy. The entire sentence reads thus: "Reasoning from past observation and experience, and looking dispassionately and carefully at the present state and condition of the company's mining property, based on a knowledge acquired by the same during a residence in Morro Velho of 17 years, I consider there is good reason to expect that the future dividends from the mine should be better and larger than those heretofore paid to the shareholders." He then goes on to say: "This statement has, perhaps, been too fully realised in the operations of the company, and the very large profits shown to have been realised during the past 12 months. By adopting a judicious course in working the mineral lode, keeping the mine well timbered and in good working order, we may fairly hope to realise good and satisfactory dividends on our future workings." I will now formally put the resolution for the reception of the report and statement of accounts, and shall then be ready to answer any questions put to me.

Sir JOHN SWINBURNE, Bart., suggested that the accounts referred to on page 5 of the report might be put plainer to them, for they were told that the report terminates, as regards proceedings at the mine, on March 31, except that the gold produced and brought into the account was for the period between April 10, 1875, and April 8, 1876; that the year spoken of in the appendix terminates on Feb. 29, and the English accounts are to May 31; so that they had four separate sets of accounts, made up to different dates, to consider, which made the matter very complicated. He would suggest that in future each of the accounts be made up to Dec. 31 and June 30. He was aware that this would give them only three months' profits instead of six at their next meeting, but he thought any inconvenience arising from this might be avoided by using part of the balance shown in the account on page 18 of the report, to equalise the dividend; in subsequent half years no such difficulties would arise. He would further like to ask whether the reservoir referred to on page 14 of the report was actually to be made, and whether the large one or the small one was to be adopted? He had attended a committee lately, where the question of reservoirs was under discussion, and he found that the idea of large reservoirs was being given up, but if with the smaller reservoir suggested they could secure 14 days extra supply of water for an outlay of the comparatively trifling sum of 6000*l.*, he thought it would be desirable that they should do so. He would further suggest that it would be more intelligible to the shareholders if the value of the gold were expressed in English money, and at the rate per ounce instead of in oitavas and pounds troy.

A SHAREHOLDER thought it a very desirable thing to learn whether the board had determined to construct the smaller or the larger reservoir

The CHAIRMAN said that as to the question of accounts, they really had but one account. The appendix was merely the reports of the heads of departments, and contained no accounts All accounts were made up to March 31. These were received in England in May, and made up with the London accounts to May 31. The eight days extra gold brought into the account were included because it was included in the same remittance as the March gold. As it was, the accounts were really three months later than they would be if made up as suggested by Sir John Swinburne, and he did not think, therefore, that the shareholders generally would desire the alteration. (Hear, hear.) As to the water, they had directed that the reservoir should be gone on with at once, and they hoped that it was now being constructed. He should explain that this project was practically to enclose the water of another stream not far off, instead of bringing water from a river 21 miles off. If they could make the 100 ft. dam with equal safety to the 70 ft. dam they would of course do it, but this was a matter they naturally left to the staff on the spot. As to the stating of the quantity of gold in ounces instead of pounds, he thought that as they had always been in the habit of using pounds the change to ounces would prevent comparison with equal facility, but Sir John could easily obtain the number if he multiplied by 12, which was a figure we were much accustomed to use in this country.

The report was then unanimously adopted; the dividend of 25 per cent. for the half year was agreed to, and 5000*l.* carried to the reserve fund. Mr. Bonamy Price was re-elected a director; Messrs. Spencer Herapath and Frederick Teudron were re-appointed auditors.

Upon the proposition of Mr. SPENCER HERAPATH, seconded by Sir JOHN SWINBURNE, the best thanks of the meeting were unanimously voted to Mr. Gordon and the staff at Morro Velho, the Chairman in putting the resolution to the meeting remarking that they all felt how much they were indebted to the staff at the mines as, they were in a foreign country, in an isolated position, with but little amusement and much hard work before them.

Upon the proposition of Sir JOHN SWINBOURNE, seconded by Mr. T. DAVIS, thanks were voted to the Chairman and directors, and the meeting separated, the Chairman congratulating them on the unanimity of feeling between the shareholders and the board.

KAPUNDA MINING COMPANY.

The annual general meeting of shareholders was convened for Monday, at the company's offices, Cannon-street; but in consequence of the non-attendance of a quorum of shareholders no business was done. Mr. C. S. BAGOT occupied the chair.

The report of the directors, prepared for presentation, stated that the lessee's working statement showed a total out-turn of 277 tons of pure copper, sold in the colony at an average rate of 67*l.* per ton. The average tonnage cost appears to have been kept within 64*l.* per ton, the small margin of gross profit having been rather more than absorbed by the office expenses on this side. The adverse balance of 270*l.* compares favourably with the heavy losses of the previous year, whilst the lessees report an improvement in regularity and value in all the sections of the lodes at the 70 fm. level, where Capt. Osborne's operations have been chiefly extended. Some fine ore was extracted at one period from the 32 fm workings, but no lasting deposits have been found there. The acid process is said to have contributed fully to the support of the general charges and to the total out turn; it was, however, much retarded and its produce of precipitate much affected by an exceptionally wet season. A scarcity of timber, moreover, has hindered the raise of ores in the low levels, tribute labour having fallen off under the superior attractions of harvest and railway work. Since the death of their late auditor the lessees' accounts have been submitted to Mr. Douglas, formerly manager of the South Australian Bank. The cessation of Messrs. N. Alexander, Son, and Co.'s business has necessitated the removal of the company's offices, but their work is conducted at a trifling increase of expense, well within the sum provided under the lease. Messrs. Alexander and Pearse have retired from the board, but the latter retains the official management of the company.

The assets of the company consist of the freehold property, plant, machinery, buildings, &c., taken at 60,000*l.*; cash in hand and at bankers, 77*l.* 9s. 2d.; and amount due from the Kapunda Copper Company, 345*l.* 12s. 6d.

KINGSTON CONSOLS SILVER-LEAD MINING COMPANY.

The ordinary general meeting of shareholders was held at the company's offices, Gresham House, Old Broad-street, on Tuesday, Mr. S. F. PORTER in the chair.

Mr. D. FORREST (the secretary) read the notice convening the meeting and the minutes of the preceding one, the directors' report, which was published in last week's *Mining Journal*, being taken as read. The following report of the agent was then read:—

June 24.—I beg to submit to you the following report of the progress of the mine, and the work accomplished generally since the commencement of active operations by the present company a little over 12 months.—Surface: All the old burrows have been shifted in order to take out the foundation for the engine house, boiler-house, and balance-bob pit, which were then forthwith built, and a 40-in cylinder pumping-engine, together with a 10 ton boiler and a cast iron balance-bob erected. Foundations for steam capstan, loadings, and extra loadings for winding machinery, &c., have been taken out, and a powerful steam capstan, with all connections, has been fixed for shaftwork and all other requirements. Excavations have also been made, and a large crusher house and crusher erected, with winding gear for hauling to the crusher. The rotary engine for hauling, crushing, &c., has undergone repairs and alterations, which make the same more effectual for its work. A 60 ft. shears, together with poppet-heads, pulleys, &c., have been fixed over the engine-shaft. Two dressing compartments have been constructed—the first as a selecting floor, and the other with dressing apparatus comprising slime separator, sizing sieves, and jigging machines, also ties and round buddle. A large reservoir has been constructed for accumulating water conveyed by a column of pipes from the shaft to the reservoir) for dressing and other purposes, and also a double catch pit to prevent the escape of slimes containing minerals. A new carpenters' shop and sump and changing-houses for men have been erected, also tramways from the engine-shaft to the upper dressing floors, and from thence to the crusher, &c.—Underground: The engine-shaft has been sunk to the required depth for another level—the 30 fm. level, or about 12 fms. below the 18 fm. level, and the old drawing lift has been removed and a new and complete 12-in. plunger lift fixed from the surface to within about 6 fms. of the present bottom. The shaft has also been properly divided and cased to the present bottom. The sinking of the shaft for the last 4 fms. has been on an incline to the north on the underly of the lode, the south side thereof being on the footwall of the lode. The portion of the lode carried in the shaft is of a highly metalliferous composition, and produced on this extreme south part occasionally beautiful rich work of silver lead ore. After allowing sufficient depth for the fork of the water, and also for tripplat, a cross cut about 3 fms. in length was put out for intersection of the north or ore bearing part of the lode (the lode altogether being exceedingly large, which proved to be worth 10 cwts. of silver-lead and from 10 to 15 cwts. of blende ores per fathom. The lode also contains rich sulphur, mundic, prian, quartz, capels, and copper pyrites, and is in every respect a very healthy and masterly lode. At this, the present bottom, a good-sized trip plat has been taken out, and a flat soller laid down. The drivage has since been turned on the course of the lode both east and west; in the former direction this (the 30) has been extended 5 fathoms, and the lode has for that length produced from 5 to 8 cwts. of silver lead, and about the same quantity of blende ore per fathom. In the latter direction (west) the level is extended 8 fathoms, and the lode for the first 2 fathoms yielded 10 cwts. of silver lead, and about the same quantity of blende ores per fathom For the remainder of the drivage the lode is somewhat disordered, but is now again becoming more compact, and producing saving work of silver lead and blende ores. In the bottom of the 18 west two winzes have been sunk to a depth of about 11 and 12 fathoms respectively. No. 1 winze, which is 10 fathoms west of the 18 cross cut, yielded for the first 5 or 6 fathoms silver-lead ore, varying from 5 to 10 cwts. per fathom, then for some depth became unproductive, and has since very much improved, producing in the present bottom rich saving work of silver-lead and blende ores. No. 2 winze, which is some 35 fathoms to the west of the 18 fm. level cross-cut, has produced silver lead ore, varying from saving work to 6 and 10 cwts. per fathom, and in the present bottom the lode is still strong and healthy, yielding about 5 cwts. of silver-lead and about the same quantity of blende ores per fathom. The 18 has been extended west altogether about 90 fathoms. The lode has been for the best part of the drivage very strong and healthy, being composed of capels, quartz, prian, iron pyrites, copper pyrites, carbonate of lead, fahlerz, with sulphide of silver, argentiferous galena, and blende ores. The lode throughout the level has yielded silver-lead ore, varying from saving work to 5, 8, and 10 cwts. per fathom, also blende ore in rather over equal proportion. Two stopes have been worked in the back of the 18, and near the 18 cross cut, which have been continuously productive to the extent of from 8 to 10 cwts. of silver-lead, and about 15 cwts. of blende ores per fathom. The two winzes to which allusion has been made, are for the present suspended on account of deleterious air; a communication will, however, be effected with No. 1 winze in the course of another two or three weeks, which will increase the ventilation, and we shall then in all probability be able to resume the sinking of No. 2 winze, and the driving the 30 west will be pushed on with all possible force towards that point. The 18 will be extended some 10 or 15 fathoms further west, so as to get on the other or western side of the valley, and, as recommended in Mr. Sopwith's report (the consulting engineer), a new shaft will be made at that point, which will afford us considerable ventilation for stoping the ore ground along the back of the 18, and also afford us great facility for the further development of the mine westward. The engine shaft is again in regular course of sinking below the 30, and if all goes well we hope the same will be down the required depth for another (the 40) level in about 20 weeks from the present time. As soon as this (the 40) is attained and opened out in connection with 30 above the position of the mine will be greatly improved, as in every probability when these and the operations already referred to are accomplished, taking it for granted that the lode will continue productive, as we have every reason to expect, we shall be enabled to make profitable returns. Up to June 1 current over 900*l.* worth of ore has been sold, a satisfactory return, considering the confined extent of the operations up to the present time.—GEORGE F. RICHARDS.

The subjoined special report of Mr. Thomas Sopwith, jun., the consulting engineer, was also submitted—

I made an inspection of your mine the 4th instant, in company with Mr. Porter and Mr. Engelbach. We were met at the mine by Mr. Sims, Captain Richards, Mr. G. F. Richards, and Captain Chynoweth, the resident manager. Since my last visit in November, 1874, important additions have been made to your works at surface and underground; the latter, as being of most interest, may first be considered.

MINING WORKS.—The vein in the 18 fm. level, which, when I last reported, had been extended 14 fathoms west of the engine-shaft, and which then showed unmistakeable symptoms of further continuance, has now been driven on about 80 fathoms, continuing, as before, regular and well defined. The whole of it carries lead ore in quantities which will pay for extraction, no part of it being richer than the last 12 or 15 fathoms driven. This end is close, and requires ventilation. I will refer to this later on in this report. From this level (18 fms.) two winzes have been sunk, each of them about 10 fathoms deep, and are being continued with a view to afford ventilation to the 30 fm. level, which will soon be extended below. They are respectively about 12 and 37 fathoms west of the engine shaft. They have gone through ore, and there seems every prospect of the whole of the ground which will be laid open by them from the 18 to the 30 fm. level, being available for profitable working. The 18 fm. level, east of the engine-shaft, has not been extended; it is desirable it should be when the funds at your disposal admit of your undertaking further operations. The engine-shaft has now been sunk to a depth allowing you to intersect the vein in or close to the shaft at a depth of 30 fathoms below the adit, and I was pleased to be able to see the vein at that depth, the beginning of what you will afterwards have frequent occasion to hear of as the 30 fm. level. I will not say I was surprised to see the improvement manifest at this depth, as I have previously observed that the 18 fm. level was too shallow to form an opinion upon the value of the vein in depth. The matrix of the vein is of the most kindly and favourable appearance; its width is 8 or 9 feet, separated by a horse or rib of unproductive rock 2½ to 3 feet wide, which will probably disappear as the vein is either driven or sunk upon. The underlie of the vein approaches more to the vertical, below the 18 fm. level, than it does above it, which I look upon as a favourable indication; the lead ore is more abundant, and I may say the vein is richer than in any part of it yet seen in the 18 fm. level, or above it.

In addition to the works mentioned, I saw two stopes between the 18 fm. level and the adit level in good ore ground, from which your present returns are principally made, and which show no signs of being exhausted; on the contrary, they can be more actively worked when men can be spared from the more important and necessary works of development below. The most necessary work I now observe for you to undertake is the sinking of a shaft from surface to the west end of the 18 fm. level to afford ventilation. When this is completed you will be able to commence more stopes. If you are not disposed to increase the number of miners, the two winzes already referred to may be worked with half their present complement of men, and the remainder set to work on the shaft. This shaft may be partly in ore ground; it will require three or four months to complete, and will cost probably 70*l.* to 80*l.* The 30 fm. level must also be extended upon westward with all possible speed; sufficient ore will probably be raised from it to defray the cost of this work.—Reserves: Although there are hardly sufficient works to allow of these being calculated as in older worked mines, I consider that you may fairly estimate that the 18 fm. level, now 80 fms. long, will be ore producing for 5 fms in height above, and 10 fms. in depth below—say, 1200 square fathoms—averaging 8 cwts. per fathom, say 480 tons, worth, at your present selling price, 18*l.* per ton, 8640*l.*; a satisfactory return, considering how little has yet been done, and that in all probability the best part of the vein has yet to be reached.—Rate of Production: Until other stopes can be commenced the monthly raisings are not likely to exceed 10 to 15 tons of lead ore, and 25 tons of blende. For any considerable increase you must wait until the 30, west of engine-shaft, is communicated by the winzes with the 18 fm. level, by which time the shaft should be down to a 40 fm. level. If the works are vigorously prosecuted, by the end of this year (1876) you should arrive at a production of 30 to 40 tons of lead ore per month, and (say) 60 tons of blende. The mine is not yet self-supporting, but the expenditure necessary to make it not only so, but profitable, will not, I think, exceed 2000*l.* over and above the amount you will have disposable proceeding from current sales of ore.—Dressing-Floors: The machines applied are of improved construction, and the ores are dressed to a higher tenure than I formerly anticipated could be done with such a moderate amount of plant. Some further additions of ties and round buddles are desirable, and at a later date it will pay you well to adopt some German machines for treating slime ores. Your present plant could, by using the engine for winding at night, prepare up to 40, perhaps 50, tons of lead ore per month, and 80 or 100 tons of blende. The raff-wheel of the crushing-mill requires alteration, and the attention of your dresser may be directed to the present working of the jigging machines. I think those used for dressing the small sized stuff should be worked with greater speed and shorter strokes than at present.—Surface Plant: The following is an approximate inventory at this date of plant, machinery, and buildings: Machinery: One 40-in. cylinder pumping-engine, about 80 horse power, 10-ft. stroke in cylinder, equal beam, complete. One 10 ton boiler, with steam pipes and all connections complete. One cast iron balance bob, with brass bearings, &c., about 10 tons. One 18-in. cylinder rotary engine, improved piston, &c., complete, for winding and working steam capstan, and for working crushing and dressing machinery. One 8-ton boiler, with all fittings complete. A new powerful steam capstan, with steel wire-rope complete. One double iron cage, with steel wire rope attached to rotary engine. One 50 ft. shears, with two large pulleys, saddles and brasses fixed over engine-shaft complete. One set of poppet heads 40 ft. high, and enclosed with two 6 ft. pulleys, with saddles and brasses complete.—Dressing Apparatus: One 26-in. roll crushing-mill, and all connections complete. One returning or elevation wheel outside crushing room, with slime-sizing apparatus attached. No. 1 dressing floors, 45 ft. by 19 ft., with three ties and one jigging hutch. No. 2 ditto, 49 ft. by 26 ft., with three compartments (eccentric) continuous jiggers, with stands, drums, and shafting all complete. One 12 ft. by 12 ft. waterwheel and connections complete. No. 3 selecting dressing floors, 55 ft. by 46 ft., with picking table, hutch, &c.; one round spinkles buddle, with floors.

PLANT.—20½ fms. of 2 ft. 4 in. launders for conveying water; 27 fathoms of 1 ft. 4 in. launders for conveying water; 191 fms. of 6 in. launders for conveying water; 50½ fms. of tramroad from the shaft to the higher dressing floors, with high stands; 21 fms. of tramroad from selecting dressing-floors to crusher, one-half with high stands; 64 fms. of 6 in. and 7 in. water pipes, laid for conveying water from shaft to reservoir.

RESERVOIRS.—For storing water for dressing purposes, containing, with 6 feet depth of water, 260,000 gallons of water, made in earthwork 87 ft. by 81 ft. by 9 ft. deep, easily converted by lengthening one side so as to hold double the present quantity of water. One double catch pit 63 ft. by 33 ft. by 5 ft. deep, with level proceeding therefrom about 120 ft. long.

BUILDINGS.—One large shed over jiggers, &c. (double roof), 64 ft. by 39 ft.; ore house; smith's shop; carpenter's shop; changing and lump houses for underground men; office and kitchen; store house; powder house; one large engine-house, containing 40 in. engine, with chimney 80 ft. high, and boiler-house attached; one engine-house, with chimney 50 ft. high, and boiler-house attached: one crusher-house, with two floors complete, steam capstan loadings between winding engine and crusher house.

I am instructed to reply categorically to the following queries:—1. Dressing Machinery: If everything that could be desired?—2. Whether more than 10 or 12 tons of lead ore could not be raised and dressed monthly at present?—3. What ought to be the cost of raising the ores (lead and blende), and also the cost of crushing and dressing?—4. Should we drive both levels eastward?—5. When the 30 fm. level has been driven on west, how much ore ought we to get monthly?—6. What our cost-sheets ought to amount to monthly for next 12 months, and if sufficient ore ought not to be obtained to leave a good profit on the whole working cost, including materials?

In doing so I must observe that over and above the contingencies which arise in all mining operations, which in this case do not put me much under reserve, results will depend considerably on the early completion of the works I have indicated as necessary. 1. With an alteration to the crushing-mill (raff-wheel), and the addition of one or two ties, and two additional round buddles, the dressing machinery is suitable for your probable requirements for the next year or year and a half. It is well arranged, and can be added to meet your future requirements.—2. Not more than 10 or 12 tons per month can be raised at present without stopping important works.—3. The actual cost of producing lead ore should not, I other costs for exploratory works, sinking shaft, winzes, and driving levels be separated, be more than 15*l.* per ton, of which probably 1*l.* to 1*l.* 10s. will be for dressing. This estimate is rated on the present production of (say) 10 tons per month, and allows for a proportionate share of general expenses; on a larger production the cost would be less, particularly in dressing.—4. I am not prepared to advise, all circumstances considered, the driving of the 18 eastward until a larger production is obtained from your works westward of the shaft. The 30 should be continued east so long, at any rate, as it is ore-bearing. At some future time both levels should be driven east.—5. Within a month or two of the 30 reaching the second winze west of shaft, a production of 30 to 40 tons per month may be expected.—6. Your cost-sheets should not be less than 400*l.* per month over the next six or eight months, and probably 500*l.* when more men are employed, as will be necessary when new and additional stopes or ore workings are commenced; by the end of 1876 a profit of over 300*l.* per month should be realised.

SAMPLES.—I took samples as follows:—1. Marketable ore from ore house ready for delivery.—2. Marketable blende. These were assayed by Mr. F. Claudet, 6 and 7, Coleman street, E.C., with following results:—1. Contain 76½ per cent. of lead; 18½ ozs. of silver per ton of ore. This ore is well sold at present market rates for 18*l.* per ton.—2. Contains, in addition to blende, 6¾ per cent. of lead; 7½ ozs. of silver per ton ore. I understand that this has been sold at the rate of 70s. per ton with 7½ ozs. of silver; it is worth 15s. or 20s. more, but there is very little competition amongst buyers for this class of ore, and it will be difficult to realise more than the value for zinc. In concluding my report, I have pleasure in expressing a favourable opinion of the services rendered by Mr. G. F. Richards in the interests of the company.—T. SOPWITH, jun.

The CHAIRMAN believed they had now all the necessary informa-

tion before them, including the report of their consulting engineer —Mr. Thomas Sopwith, jun.; and as he was now present he would ask him to say a few words with reference to the mine.

Mr. SOPWITH was not aware that he could add anything material to what he had already stated in his report, especially as he saw that gentlemen were there from the locality who had seen the mine since he was there, and who knew the details better than he. He might, however, say that Mr. G. Richards appeared to have stated the position and prospects of the mine temperately and fairly. He noticed that all the ore ground to the west of the shaft was valued by Mr. Richards at from saving work to 5 cwts. and 6 cwts. per fathom, and he felt some confidence in telling them that Mr. Richards's was low, in his opinion, as a general estimate of the ground. He did not think that the stopping of the two winzes referred to was any disadvantage to the company, as they were the very winzes which he had pointed out might well be stopped, as they could be more easily and cheaply worked when the deeper level is under them. He did not know whether the 8 to 10 ft. mentioned was the whole width of the lode, or whether it was including the 4 ft. of horse in the middle. He quite believed that with 1200*l.* beyond what they would get for the ore they would be placed out of difficulty. If all the money that had been expended had been put in at once there would, no doubt, have been more work done.

Mr. RICHARDS (director) said that the width Mr. G. Richards referred to was no doubt the width of the vein itself; he had nothing to add to what Mr. Sopwith had said, and he quite agreed with it.

Thanks were voted to the Chairman and directors for their services during the past year, and the meeting then separated.

GREAT WHEAL VOR UNITED MINING COMPANY.

The quarterly general meeting of adventurers in the above mines was held on Thursday, at their office, Gresham House,

Mr. JOHN O. HANSON in the chair.

Mr. J. JAMESON TRURAN (the secretary) read the notice callling the meeting, also the committee's report, Capt. Harris's report, and the special report of Captain Josiah Thomas, of Dolcoath Mine, as follows:—

The committee beg to present their quarterly report, and in doing so they much regret that it is not in their power to announce any improvement in the position of the company beyond what was stated at the last meeting. The price of tin has, unfortunately, continued low, whilst that improvement in the lode which was hoped for in the sinking of the shaft has not yet taken place, or at least not to the extent that was anticipated by the manager. In addition to this, the returns which were confidently expected by the manager after the supply of the necessary machinery—Husband's pneumatic stamps and an engine to drive them—have not been realised, and the consequence has been that the outlay has not yet been recouped, as was anticipated. The shareholders will remember that two years ago a considerable number of shares were relinquished by their fellow-adventurers, and the time has now arrived when it is necessary to pay them their proportion of the assets which was then ascertained and agreed to by them—688*l.* 12s. 1d. On this subject a special meeting was called in August, 1874, when the arrangement was approved. Should the mines improve, or the position of the tin market alter, these relinquished shares would become an available asset. In the present position of the company the committee, finding the mines cannot be carried on without the assured support of the shareholders, have deemed it advisable to take the opinion of a competent mining captain, and they requested Capt. Josiah Thomas, of Dolcoath Mine, to inspect and report on the company's property, and whose report is submitted to you on this occasion.

On the publication of the audited accounts to April 29 last there was

A balance in hand of		£ 506 2 11
Since which date there has been received—		
Tin sold, May 18	114 18 0	
,, June 15	110 13 4	
On account of call made March, 1876	283 14 2	
Tribute on tin sold	18 16 2	
,, on arsenic sold	2 7 6	
Sundries from the mines	14 8 2	
Total		£1051 0 3
And paid—		
Loan from Messrs. Harvey and Co.	£265 14 3	
Labour pay to April 22	253 11 6	
,, May 20	170 8 9	
On account of merchants' bills	52 10 3	
Sundries, postage, &c.	4 6 4	746 11 1
Balance		£ 304 9 2

The actual account stands this day as follows:—

LIABILITIES—Merchants' bills	£1812 15 9	
On relinquished shares	688 12 1	
Lords' dues	19 15 1	
Salaries, &c.	101 0 0	
Harvey and Co., for balance of stamps	130 0 0	£2752 2 11
ASSETS—Balance as above	304 9 2	
Arrears of calls	79 14 5	384 3 7
Balance against the mine		£2367 14 4

For the purposes of the mines, and to pay off the relinquishing shareholders and other liabilities, the committee recommend a call of 10s. per share.

June 26.—I beg to submit the following report:—West Metal engine-shaft is sunk 7 fms. below the 80. In the last 2 or 3 fms. sinking the lode has improved in size and appearance, and is now in the present bottom of the shaft 3 ft. wide, of a very kindly nature, and producing a little tin, but not sufficient to value. In about from 10 to 15 fms. more sinking we shall intersect the western cross-course, which would be be a very desirable point to reach, having from this to another large cross-course about 80 fms. of almost unexplored ground, and between these two cross-courses the parallel lodes of the district have been found productive. As soon as the shaft reaches the 90 I advise that a level should be driven east to intersect it; then by opening a few fathoms east of it on the course of the lode it would give us some idea of what we might expect to meet with by sinking the shaft. I never saw a more promising lode in the mine, and I fully believe by exploring the mine in the direction I have named that tin will be met with in paying quantities even at the present low price. During the past fortnight we have raised the flaunders that carry the water from West Metal to Edward's shaft sufficiently high to condense the 60-inch engine, thereby allowing all the water that is pumped from the adit level at Edward's shaft to pass on to the dressing-floors, which have increased the supply from one-third to a half. Had we had the advantage of this additional water before we should have returned more tin. We did not get that benefit from the stamps that we had hoped and expected, but now with a better supply of water we shall be able to deal with a greater quantity of stuff, and notwithstanding the stuff on the floors getting of less quality, we shall be able to keep up to the highest returns we have made for another six months without any material improvement in the mine. We are well supplied with materials of all kinds, and the pneumatic stamps and other machinery are working most satisfactorily.—S. HARRIS.

Dolcoath Mine, June 28.—I inspected this mine both at surface and underground yesterday, and beg to send you the following report:—West Metal shaft, after having been drained and enlarged, has been sunk from the 70 to 7 fms. below the 80. Between the 70 and 80 the lode produced rich stones of tin. A small portion of this ground was afterwards worked by tributers in the eastern end of the shaft above the 80, but was soon abandoned, and the lode on the whole will not pay for working at the present low price of tin. Below the 80 the lode contains only a small quantity of tin, but at the deepest point has a far more promising appearance. In the bottom of the shaft the lode is 2½ ft. wide, and is altogether more settled and well defined than in the upper levels, being similar in appearance to the lode near the rich deposits in other parts of the mine. I think the best chance of success is by sinking the shaft as rapidly as possible. At present there are only nine men in the shaft who are not actually working on the ground the whole of the time. If 12 men were to be employed no doubt the ground could be sunk more rapidly; and as the cost of working the pumping-engine is the same whether the shaft is sunk fast or slow, the faster it can be sunk the cheaper per fathom it will really be. When the 90 is reached I think it would be advisable to drive east to the cross-course, which is probably only a few fathoms distant, as the lodes near the cross-courses are frequently more productive. I cannot recommend the driving of the shallow levels at present, as I think there is a much better prospect of success in sinking the shaft, and money would be more judiciously expended there than in driving on the lode in the upper workings. The best quality of tinstuff on the floors has been dressed up, but there is a large quantity of stuff of low quality still lying about, a good deal of which will scarcely more than pay the cost of stamping and dressing with the present low price of tin. I find that the returns of late have been a little over 3 tons of tin per month from the floors and burrows, but the stamps have only been worked about half the time. If the stamps be kept fully working, I think about 5 tons of tin per month might be returned for the next six months, at a profit of (say) 5*l.* per ton. A little cost in dressing might, I think, be saved if the stuff to be treated were to be all put through the stamps instead of being partially washed at first, as is now being done. It must be understood, however, that in a case like this, where the stuff is of such low quality, and scattered over such a large extent of ground, it is impossible to make a strictly accurate calculation of the returns or cost of dressing. To keep the pumping-engine working, and to work the shaft by 12 men, might probably cost about 150*l.* per month, to which the cost of driving the 90 east (if you decide on doing so) must be added. Deducting the profit you may calculate on making by dressing the tin on the floors, I think the total loss on the plan of working above suggested, for the next six months, would not exceed 900*l.*, and I should not be surprised if, before the termination of that period, something of value is discovered.—JOSIAH THOMAS.

The CHAIRMAN said he was sorry that mining pursuits formed no exception to the many varied branches of industry carried on in this country over which at present there seemed to exist such very great commercial gloom and depression; and, as the mouthpiece of the committee, he must express the deep regret which they felt that it was not in their power to present the adventurers with a more satisfactory report. Capt. Harris was in the room, and would be happy to give any explanations which might be desired. They had heard the report of Captain Josiah Thomas, one of the most experienced mining agents in Cornwall, who was called in by the directors in order that they might have his advice in addition to that of Captain Harris, because the committee could not shut their eyes to the fact that the company was at the present time in a somewhat critical condition, and the encouragement to go on was not great; but, on the other hand, they must bear in mind that if they were to give up now they might, possibly, be giving up a very good thing. The committee could not shut their eyes to the fact that on the same lode the company had formerly been enabled to make very good profits. This was not the first time the company had been in straightened circumstances, because some years ago they were about 50,000*l.* in debt, but by courage and perseverance that had been wiped off, and during the ensuing 14 years about 90,000*l.* was paid in dividends. The company's difficulties arose not only from the low price of tin, but also from the non-improvement of the lode in the shaft, and likewise from the expectations relative to the increased returns from the stamping appliances not having been fulfilled, and from which some profit was expected, which would have assisted in the sinking of the shaft. As far as could he estimated the monthly losses were about 150*l.*, but in six months it was calculated that they would reach the 100, at which point it was believed that the lode would materially improve.

A SHAREHOLDER: How much are the liabilities altogether?—The CHAIRMAN: About 2700*l.*

The SHAREHOLDER: Will a call of 10s. pay all the liabilities?

The CHAIRMAN: It will enable us to discharge the greater amount of them, and leave us with all our plant entirely free. We have had an estimate made of the plant and engines, and so forth, and the value is 3094*l.*, so if we clear that off it will place the mine in a good position. Our solicitor advises us to make a 10s. call, which will give us 2250*l.* In conclusion, the Chairman moved that the accounts be passed.—Mr. WALKER seconded the resolution, which was carried.

The CHAIRMAN then moved that the reports be printed, and circulated amongst the shareholders.—Mr. WALKER seconded the resolution, which was also put and carried.

The CHAIRMAN then moved that a call of 10s. per share be made payable forthwith, and that a discount of 5 per cent. be allowed on all amounts paid on or before July 31.

Capt. HARRIS, in answer to a question, said that the object which they had in view—carrying the mine down to a certain depth—would be done in about six months, and at a cost of about 900*l.*; that object was so important that he advised the shareholders in all sincerity to attain it.

Capt. HARRIS, in answer to a further question, said that if they lighted on the same lode which they had some time ago a profit could be made even at the present low price of tin.

The resolution was then seconded by Mr. MARSDEN, and carried.

A vote of thanks to the Chairman and committee closed the proceedings.

THE EBBW VALE IRON COMPANY.—The annual meeting of shareholders was held in Manchester, on Thursday. The Mayor of Manchester, Mr. Alderman Curtis, the Chairman of the company, presided. The report of the directors, already published, was taken as read, and the Chairman moved its adoption. He said the report was one of the most unfavourable which had ever been laid before the shareholders At previous annual meetings the general body of shareholders had cordially approved of the recommendations of the directors as to the extension of works, and he himself had no hesitation in saying that the money which had been expended in the past year on improvements had increased the value of the property, as it had increased the means by which, on the revival of trade, they might earn a large reward. The works of the company were now in such a state that if trade justified they could raise 2,227,000 tons of coal per annum. Mr. Philips, the Vice-Chairman, seconded the adoption of the report. A long discussion ensued, in which it appeared that shareholders representing over one-seventh of the company had, at a meeting held at the Clarence Hotel, on Wednesday last, determined to request the directorate to concede to a proposal to appoint a committee of shareholders to confer with the directors as to the best means of strengthening the board by the election of gentlemen connected with the coal and iron trades, and to consider the position and future management of the company. The board of directors in an interview with the leaders in the movement for an enquiry, willingly consented to adopt that course, and eventually the report was duly received. A committee was appointed to confer with the board, and the meeting was adjourned until July 26, when their report will be considered. The Chairman, on behalf of the directors, said if it were the wish of the shareholders that such a course should be taken the board was quite prepared to resign.

NORTH LEVANT.—A meeting of adventurers was held at the mine, on Friday, Mr. R. Boyns, the purser, in the chair. The accounts for the 16 weeks ending April 29 showed—Labour cost, 2025*l.* 11s. 4d.; merchants' bills, 331*l.* 0s. 6d.; coals, 221*l.* 10s.; total, 2578*l.* 1s. 10d. Credits were—61 tons 16 cwts. of tin sold, less lord's dues, 253*l.* 14s. 5d.; copper ore, less lord's dues, 148*l.* 4s. 1d.; total, 2686*l.* 18s. 6d. Profit on the 16 weeks working, 108*l.* 16s. 8d.; balance in favour of adventurers from last account, 381*l.* 6s. 8d.; total credit balance, 490*l.* 3s. 4d., which was carried forward to the next account. The adventurers warmly congratulated the purser on his good management and success in working the mine at a profit in these bad times. The agent's report, after recapitulating the various points in the mine, says in conclusion, "Our sales of tin have been a little less, and of copper more than we anticipated, but on the whole the returns are about equal to our expectations. Our returns for the coming 16 weeks will be nearly equal to those of the past." Mr R. Boyns says—"The opinion expressed in my last circular that the supply from Australia would be less this year than last is being amply confirmed month after month by lessened importations; and despite political disquietude abroad, and well-nigh commercial stagnation at home, the stock of tin instead of continuously increasing, has at length diminished a little two months in succession, so that with a return of only ordinary commercial activity we may yet see a better price in 1876 than in 1875."

'For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

As regards the French coal trade, it must be said that the downward tendency which has been remarked in prices of late has become rather more decided than otherwise. We must not, however, draw too severe conclusions from this, as every year at this season a similar feebleness is generally indicated in prices. Attention has been a good deal directed to the fact that the Parisian Company for Lighting and Heating by Gas has given out an order for coal in Germany. The fact must not, however, be overlooked that the company has previously obtained a portion of its coal supplies from Belgium and England, and that it has never purchased coal exclusively in the French markets.

There is scarcely any change to report in the Belgian iron trade. According to a report prepared by M. Bercheim, mining engineer, the iron mineral workings of the province of Namur appear to be threatened with decadence; 15 years since the province supplied three-fourths of the minerals consumed in Belgium; it exported, besides, more than 100,000 tons per annum. The minettes of the Grand Duchy of Luxembourg have, however, replaced Namur minerals to a considerable extent; and, comparing 1875 with 1860, the ironstone production of the province of Namur presented last year a falling off of nearly 38 per cent. The progressive substitution of steel for iron also exerts an adverse influence upon the ironstone production of the province. Germany alone can now produce, it may be observed, 700,000 tons of steel annually. In 1875 only 198 workings of iron minerals were in operation in the province of Namur, while in 1874 the corresponding number of workings was 253. The production of 1875 amounted to 272,000 tons, against 387,000 tons in 1874. Contracts for 65 locomotives are about to be let at Cologne and Berlin. The Gluckstadt and Elmshorn Railway Company is also about to let a contract or contracts for 21,000 tons of rails, with accessories.

The Belgian Minister of Public Works has let contracts this week for 35,100 tons of coal. M. Berchem, a mining engineer, has just issued his report upon the progress of mineral industry in the Province of Namur in 1875. The province possssses, it appears, 39 collieries, having an aggregate extent of rather more than 30,000 acres; 21 of these mines were in activity in 1875, and they produced between them 491,365 tons of coal, of an aggregate value of 237,244*l.* In 1874 the corresponding production amounted to 440,125 tons, and the corresponding value to 226,511*l.* The selling price of each ton of coal in 1875 was thus 8d. per ton less than in the corresponding period of 1874. The number of miners and workmen employed in 1875 was 3662, or 122 more than in 1874; the average wages paid per man presented an increase of 4*l.* 1s. 8d. last year as compared with 1874. The average extraction effected per each workman employed was 442 tons in 1875, or 46 tons more than in 1874. In 1875 nine mines in the province were worked at a loss, against 13 in 1874. Notwithstanding the depression which afflicted the great industries of Belgium in 1875, it will be seen that the coal production of the Province of Namur last year exceeded that of 1874; this arose from the fact that the weather was very cold last winter, and that a large amount of household coal is raised in the province. The cost price per ton of the coal produced in the province declided to the extent of about 2d. last year. The coal production of the Province of Namur was disposed of with some difficulty last year; thus the stocks of coal at the pit's mouth at the close of the year amounted to 113,000 tons. Several colliery proprietors in the province are establishing works for the production of briquettes.

Business in copper remains quiet, and difficult at Paris, and quorations have been generally weak. Chilian in bars, delivered at Havre, has made 81*l.*; ditto ordinary descriptions, 79*l.*; ditto in ingots, 83*l.*; English tough cake, 83*l.*; and pure Corocoro minerals, 82*l.* per ton. Upon the Marseilles market copper has continued quiet. The German copper markets have presented little animation; large transactions have made default, and prices have exhibited a downward tendency. Upon the Rotterdam market tin has continued firm. Transactions have taken place in Banca at 46 fls.; at the last dates the demand was not quite so good, and there were sellers at 45¾ fls. Some rather considerable lots of Billiton have been taken off at 44 fls.; at the last dates, however, holders had withdrawn from the market, and refused to sell below 44¼ to 44½ fls. Business in tin has shown little animation at Paris, and prices have exhibited a more feeble tendency. Banca, delivered at Havre or Paris, has made 83*l.*; Straits, 79*l.*; and English, delivered at Havre or Rouen, 82*l.* per ton. Tin has also been declining upon the German markets. English, French, and Spanish lead has brought 21*l.* 8s. per ton at Paris. There has been little business done in lead upon the German markets, and prices have ruled weak. At Paris zinc has been quiet; Silesian, delivered at Havre, has made 24*l.* 8s. per ton; and other marks, delivered at Havre, 24*l.* 8s. per ton.

There is scarcely anything new in the French iron trade. The depression and apathy noticed for some time past still prevail. A current of business still continues, but it is characterised by great feebleness. Merchants' iron, girders, and rails appear the most neglected; the demand for pig is also relatively weak. The question of the maintenance of the system of warrants excites some interest. The Bouches-du-Rhone Collieries Company commenced the payment on July 1 of a dividend for 1875 at the rate of 1*l.* 4s. per share.

PRODUCTION OF IRON AND STEEL IN THE UNITED STATES IN 1875.*

By JAMES M. SWANK, Secretary.

The American Iron and Steel Association has received from the manufacturers and from its correspondents full statistics of the production in 1875 of pig-iron and blooms, bar-iron, nails, iron and steel rails, and crucible and other steel, also returns showing the quantity of pig-iron in stock at the close of 1875. That our readers may understand how carefully they have been prepared, and how exhaustive have been our efforts to procure exact data, we may state that we have returns in our office, either directly from the manufacturers or from our correspondents, of the production of every rolling mill, except two merchant mills, every furnace except five, and every steel-works except one. The production of only eight establishments in the whole country has, therefore, been estimated, and of these eight it may be said that we know their capacity, and know also whether they were running or silent in 1875.

We gratefully acknowledge our obligations to the iron and steel manufacturers of the country, and to our special correspondents for the courteous and appreciative manner in which they have aided our efforts to secure early and accurate statistics of the operations of the past year. We have been most kindly treated, and in return for this confidence and assistance it is a real pleasure to us to be able at this early day to present to our friends complete and accurate aggregates of production in every branch of the trade in 1875.

PRODUCTION OF PIG-IRON IN 1875.—The production of pig-iron in 1875 was 2,266,581 net tons, against 2,639,413 tons in 1874, 2,868,278 tons in 1873, and 2,854,558 tons in 1872. The decrease in 1875, as compared with 1874, was 422,832 tons, or more than 15 per cent. The following States, however, increased their product in 1875 over 1874:—Maine, Virginia, Georgia, Indiana, Illinois, and Wisconsin. The decrease was all in anthracite and charcoal pig-iron, respectively 294,098 and 165,567 tons, while there was an increase in the production of bituminous coal and coke pig-iron of 36,833 tons, the net decrease being as stated, 422,332 tons.

The number of completed furnace stacks at the close of 1875, not including abandoned stacks, was 713, against 693 at the close of 1874, 657 at the close of 1873, and 612 at the close of 1872. The number of stacks added to the productive capacity of the country in 1875 was, therefore, 20, against 36 in 1874, and 45 in 1873. These figures, however, do not represent the whole number of new stacks built in these years, as some furnaces were abandoned in each year. The exact number of new furnaces completed in 1875 was 24, against 38 in 1874, 50 in 1873, and 41 in 1872. Of 713 completed stacks at the close of 1875, 293 were in blast, and 420 were out of blast.

The stock of pig-iron unsold at the close of 1875—that is, in the hands of furnacemen or their agents—was 760,908 net tons, of which 320,683 were charcoal, 165,482 bituminous coal and coke, and 274,743 anthracite. The corresponding figures at the close of 1874 were as follows:—Charcoal, 330,317 tons; bituminous coal and coke, 216,479; anthracite, 248,988: total, 795,784. The aggregate shrinkage in the quantity of unsold pig-iron at the close of 1875, as compared with the close of 1874, was 34,876 tons. It must be understood that we do not in the preceding figures include stocks in the hands of consumers, importers, or speculators.

PRODUCTION OF ROLLED IRON IN 1875.—The total production of all kinds of rolled iron in 1875 was 1,890,379 net tons, against 1,839,560 tons in 1874, 1,966,445 in 1873, and 1,941,992 in 1872. The figures given embrace all kinds of rails, cut nails and spikes, bar, band, hoop, plate, sheet, angle, girder, beam, boat, guide, rod, and bridge iron, and rolled axles, and exclude all forged iron, such as anchors, anvils, hammered axles, cranks, ships' knees, &c. Deducting nails and rails, the production of rolled iron in 1875 was 851,524 tons, against 864,538 tons in 1874, and 875,133 in 1873.

The production of cut nails and spikes in 1875 was 4,726,881 kegs, against 4,912,180 kegs in 1874, and 4,024,704 kegs in 1873. The production of iron and steel rails of all sizes in 1875 was 792,512 net tons, against 729,413 tons in 1874, 890,077 in 1873, and 1,000,000 in 1872. Of the total rail production of 1875, 501,649 tons were iron rails, in which we include a few solid steel and steel-headed rails, and 290,863 tons were Bessemer steel rails. In 1874 the production of iron rails was 584,469 tons, and of Bessemer steel rails, 144,944 tons. A notable feature of the rail product of 1875 was the large quantity of street rails that were made—16,340 net tons, against 6739 tons in 1874.

The increase in the production of Bessemer steel rails in 1875 over that of 1874 exceeded 100 per cent. We do not hesitate to predict that this country will make more Bessemer steel rails in 1876 than iron rails.

PRODUCTION OF BESSEMER STEEL IN 1875.—There were 10 completed Bessemer steel establishments in this country occupied in filling orders during the whole or a part of the year 1875. The production of Bessemer steel rails in this country since 1867, when they were first made upon orders, has been as follows in net tons:—

1867	2,550	1872	94,070
1868	7,225	1873	129,015
1869	9,650	1874	144,944
1870	34,000	1875	290,863
1871	38,250		

Fuller details of the Bessemer steel industry in this country in 1874 and 1875 are as follows:—

	1874.	1875.
Tons of pig-iron converted, including spiegel	204,352	395,956
Tons of ingots produced	191,933	375,517
Tons of rails produced	144,944	290,863

The following additional details have been procured for 1875:—

Tons of Bessemer steel street rails made	2,308
Tons of spiegeleisen used	33,245
Tons of spiegeleisen produced in the United States	7,832

21,145 tons of merchantable steel other than rails were used in the manufacture of spring and bar steel, railway axles, crowbars, and other railway tools, wagon and carriage tires, machinery and steamboat forgings, nails, horse shoes, &c. The total quantity of pig-iron (including spiegeleisen) converted by the Bessemer or pneumatic process was 140,404 net tons in 1872; 183,534 tons in 1873; 204,352 tons in 1874; and 395,956 tons in 1875. One-sixth of all the pig-iron produced in this country in 1875 was converted into Bessemer steel, and the proportion will be much increased in 1876.

PRODUCTION OF STEEL OTHER THAN BESSEMER IN 1875.—Forty-four establishments made cast, puddled, blister, and open-hearth steel in the United States in 1875. The aggregate production of all the kinds of steel named was 61,058 net tons, against 49,681 tons in 1874. Of the 61,058 tons produced, 39,401 tons were crucible steel, and 21,657 tons were puddled, blister, and open-hearth steel. Below is a table showing the production of steel in 1875 by States in net tons:—

States.	Crucible Steel.	Puddled, open hearth, and blister steel.	Total.
New England	1,620	4,510	6,130
New York	2,300	—	2,300
New Jersey	7,098	160	7,258
Pennsylvania	26,615	11,520	38,135
Maryland and Georgia	268	1,500	1,768
Ohio	1,300	3,667	4,967
Kentucky and Illinois	200	300	500
Total	39,401	21,657	61,058

* Supplement to the Bulletin of the American Iron and Steel Association, May 31.

The production of open-hearth or Siemens-Martin steel amounted in 1872 to 3000 net tons; in 1873 to 3500 tons; in 1874 to 7000 tons; and in 1875 to 9050 tons. The country has an annual capacity to-day of 50,000 tons of crucible cast-steel, and 40,000 tons of open-hearth steel.

Below is a table showing in net tons the total production of steel other than Bessemer in this country during the past 10 years:—

1865	15,262	1871	37,000
1866	18,973	1872	40,000
1867	19,000	1873	52,000
1868	21,500	1874	49,681
1869	24,000	1875	61,058
1870	35,000		

PRODUCT OF FORGES AND BLOOMERIES.

	1873.	1874.	1875.
Blooms from ore	32,863	26,450	24,416
Blooms from pig & scrap iron.	29,701	25,220	24,827
Total	62,564	61,670	49,243

IMPORTS OF IRON AND STEEL IN 1875.—The total value of our imports of iron and steel in the calendar year 1875 was $15,273,315, against $24,600,720 in 1874, $45,764,670 in 1873, $61,724,227 in 1872, and $47,919,926 in 1871.

WHY INVESTMENTS BY FOREIGN CORPORATIONS IN AMERICAN MINES FAIL TO BECOME PROFITABLE.

The question often asked—"Why do mines that yield handsome incomes to American operators fail to pay when once sold to, and managed by, foreign corporations?" is worthy of serious consideration. In California, we believe, foreign companies own the Battle Mountain, Birdseye Creek, Cedar Creek, Ferguson, Gold Run, London and California, Sierra Buttes, Sweetland Creek, and other mines. In Nevada they are owners of the Mineral Hill, Eberhardt and Aurora, and Exchequer. In Utah the Emma, Flagstaff, Chicago, Last Chance, and Davenport. In Colorado the Terrible, Caribou, Silver Plume, Kansas, Clifton, and others. We believe that one and all of these mines, without exception, paid satisfactory dividends while owned by Americans; many of them for a short time after their sale and transfer to foreign holders, and so far as we can ascertain the Richmond Consols and Chicago are the only two that are at present dividend-paying mines. We are not in a position to fully explain the causes of the failure among the mines cited of those of the Pacific Coast, but of those in Colorado we can, and it is natural to presume that the same reasons assigned will hold good when applied to those of Utah, Nevada, and California.

As a notable illustration and example, we will take the Caribou; to Colorado it was what the Comstock is to Nevada. First discovered in the spring of 1870, it paid largely from the grass roots down In the fall of that year one-half of the mine was sold for a large sum to a Cincinnati capitalist, who, being a keen, practical business man, gave his personal and exclusive attention to developing the property. During the first year of his ownership he sold to Prof. Hill at Central 631 tons of ore that averaged $151·20 in coin per ton; this ore was produced principally from sinking the shaft and other developments in this mine. The first year's results of operation justified him in the erection of a chlorination mill, which was built within four miles of the mine at a cost of some $75,000, with a capacity for treating 20 tons of ore per day at an expense not to exceed $12 per ton. Prof. Eggleston, of the New York School of Mines, pronounced the same, when completed, to be a perfect mill The next step was to secure the other half of the mine; this, too, was accomplished, and under one and the same management. The estimated profits of mine and mill were $1000 per day, while still the regular development of the mine was being prosecuted. Both mine and mill were open to the inspection of all who cared to visit and examine them. What experts thought of the mine can be legitimately inferred when we say that our well-known and esteemed townsman, Hon. Jerome B. Chaffee, the Sharon of Colorado, stated in terms that "if the mine was worked to its full capacity it would produce $5000 net profit per day."

In September, 1871, John Taylor and Sons (of the best known and respected mining engineers in the world) estimated that the value of ore then in sight was 3:0,000/., or (say) $1,700,000 in coin. In February, 1872, the Messrs. Lewis and Son, of Liverpool, calculated the value of the ore in sight at $2,.00,000. Hundreds of ore assays were made by Claudet, of the Bank of England. Prof. Schirmer, of the Denver Mint; Peters, of Boulder; and others, showing the average value to be over 500 ozs. to the ton. In April, 1873, Mr. M. Anker, a well known operator in mines, offered the owners $1,000,000 in cash for the mine and mill, which offer was accepted. He in turn sold the same property to a Dutch company for $3,00:,000. This sum was, in our opinion, altogether more than its real value, but it is simple justice to say prior to the sale, and during the negociation, the company sent out P. H. Van Diest (then the chief mining engineer for the Dutch Government) at his (Anker's) expense, together with a commission of three others, to thoroughly examine the property. They reported the ore of the Caribou Mine then in sight to be $5,700,000, and on the receipt of this report the sale was consummated, and the Dutch Company came into possession. Up to the time of transfer the Caribou was unquestionably a profitable mine. We have seen the copy of a cable despatch sent by an officer of one of our soundest banks to a correspondent in Holland (who desired his opinion about it before investing) to the effect that "the mine was yielding a profit of $1000 per day." This, so far as we can learn, is the inside history of the great Caribou Mine from the date of its discovery up to the time of its sale in May, 1873, to the Dutch Company Nederland.

It was then proposed that an American should be placed in charge of the property, one conversant with the business usages of the country, thoroughly acquainted with the geological characteristics of the locality, and a practical silver mining engineer. But this wise suggestion was overruled, and a Dutch engineer, who was undoubtedly a man of integrity and who stood high in the confidence of the shareholders and the Dutch Government, was sent out. Unfortunately, though well versed in tin mining, he had no experience in mining for silver, and from the day of his assumption of the management the product steadily diminished in proportion as expenses increased, until the latter exceeded by far the amounts disbursed at a time when the mine was yielding a profit of $1000 per day.

Thus matters went on from bad to worse until November, when the directors sent the vendor to examine into the causes for dissatisfaction, and a summary of his report told the sad story. We condense some of the salient points made in his enumeration of abuses:—No company could succeed whose chief agent, with salary of $6000 per annum, resided at Boulder, about 18 miles from the company's office and works; a mining superintendent (salary $10,0 0 per annum and free house rent) residing four miles from the mine, and spending nearly one-third of his time in Cincinnati and San Francisco; a mill superintendent, receiving $3000 per annum, who devoted as much of his time to a tunnel contract he had at Caribou as he did at the mill; an assayer (salary of $1800 per annum) who though a printer in Denver a few months previous received this position and salary because he was the nephew of the mine superintendent; a bookkeeper, receiving $1800 per annum, when a suitable person could be had for $1200; an assistant, receiving $80 per month, or $960 per annum, to weigh ore, measure wood, and do nothing; a stable built expressly for the purpose of keeping a team of mules for the chief agent; a span of fast horses for the mine superintendent; a saddle horse for his lady and one for the lady of the mill superintendent; a horse each for the chief engineer, bookkeeper, and blacksmith, and a coloured man employed at $900 per annum to take care of the horses; a physician in the employ of the company to account the wives of employees, at $1200, and feed for his horse, &c., at $300 additional; a contract made for 7000 cords of wood, at $3 62 per cord, at the mill, and $5 per cord at the mine; whereas ranchmen in the neighbourhood offered wood at the mill at $2 50 per cord, and at the mine to cost not more than $2·25 per cord. Lumber was bought at prices in excess of its value, and contracts for transportation, ores, salt, machinery, and supplies were awarded without competition allowed on the part of other teamsters.

At the mill more men were employed than there was work for them. At times men at the cylinders would go to sleep and allow their charges of ore to cool. Quicksilver was left exposed as if it had no value. Empty salt barrels, in place of being used for fuel, would be thrown in the creek. There was a complete lack of business system in the mill.

At the mine affairs were no better. It was a common occurrence for men to send up worthless rock, simply to show that a large number of bucketsful had been raised. One of the night foremen would supply the men with candles, and then retire to the engine room and sleep all night. The blacksmith would sharpen steel for other miners and retain the pay. The ore sorting was done by day's pay, and quantities of granite sent to the mill and there treated as ore. Contracts for stoping were let by the cubic foot in place of the width of the crevice matter, or ore. Poles were delivered for stulls at 30 c., when they could have been purchased at 15 c. each; freight was charged on green lumber by weight, and seasoned lumber by measurement; freight was allowed on salt at 300 lbs. to the barrel, when by weight they did not average over 250 lbs. to the barrel. Iron stacks that were ordered before the company purchased the mill were charged to the company, although they had no use for them, and never received them. Contracts were let to pay $33 per 1000 for bricks that should have been awarded at $20. And many other equally as flagrant abuses existed, &c.

The economies inaugurated and strictly adhered to during his regime resulted, as shown by facts and figures, in an actual saving to the company in expenses of 4 per cent. on the entire stock, or at the rate of $122,160·50 yearly.

Though the management was subsequently changed it was not for the better, as the directors refused to appoint any other than a Dutchman. It is a well-known fact that the Dutch are not a mining people (if we except the specialty of tin mining), and were consequently unable to secure a competent Dutch engineer. Rather than appoint an American they selected a gentleman, who though in every respect honest, was promoted from the position of bookkeeper in a Rotterdam house to assume the responsible supervision of the Caribou Mine and mill.

The company, in the interim, had no money, and were compelled to borrow and pay frightful rates of interest They were not punctual in paying their bills, and could not get the benefit of the lowest price for supplies. The mine employees were not promptly paid, and as the company were their debtors they could not be discharged for neglecting to do their tasks in a workman-like manner. All these tended to more and more embarrass the situation. Then an American syndicate proposed to furnish funds enough to the company to extinguish all their indebtedness and provide them with a working capital, with the proviso, however, that they should have control of the management. The proposal was accepted by the shareholders, but the directors refused to carry out the programme and re-signed, thus further complicating matters. In the meantime, the creditors becoming importunate, issued attachments against the property: the miners filed a lien, and thus, notwithstanding the product averaged fully $300,000/. per year since its sale, the famous Caribou Mine is in the hands of the law.

In spite of the gross mismanagement and total lack of economy that have characterised its operations during the past few years, the Caribou has ever maintained the reputation of being a first class mine. The Boulder "News," which is a reliable authority and exponent of the mining interests of the country in which this mine is located, very truthfully remarked in a recent editorial: "We believe the Caribou Mine to be one of the very best known on this continent. It produced above $200,000 last year, and was not worked extensively nor to good advantage. The production was greater than any other mine in Colorado. We hold that the trouble is somewhere one side of the line of the legitimate cost of mining and milling the ore, and therefore that the fault is not with the mine. . . . . What Mr. Van Diest stated as to the cost of mining and milling the Caribou ore, is a matter of general public interest concerning mining, which is the principal business of Colorado. Mr. Prince states that as a matter of fact it has cost a great deal more than $50 per fathom to break and raise the Caribou ore. It may have cost a great deal more than it ought to, because of the want of the proper appliances, or because the mine is not sufficiently opened in advance of stoping, or because the men could not be paid promptly, or for other reasons. . . . . .

We do not care to state the facts of what it costs to mine and mill the ore where too evidently there has been a fault of judgment in the management, or where the resources of a company have been economically misapplied, no matter by whom. As a matter of first import to our chief industry, we have enquired diligently as to the average cost of mining and milling the silver ores of this section. We are informed by the most experienced men that with the proper plant, and with the mine sufficiently opened, the cost of mining the ore will be about $10 per ton, and the cost of milling not to exceed $15 per ton. Add to this the cost of transportation (say) $5 per ton, and the whole expense is $30 per ton. The business theory is that the difference between this sum and what the ore yields will be profit or loss.

The year after the purchase of the Caribou by the Nederland Company our skilful mining expert, Prof. Charles S. Richardson, made a thorough examination of the mine, and his report was subsequently published in the London *Mining Journal*. We quote therefrom as follows:—"There have been 2000 fms. of ground removed in shafts and stopes, from which there has been returned, up to December, 1873, $619,757 worth of ore, being equivalent to $309·87 per fathom of ground. Now, when it is known that the average value of the ground in sinking, driving, and stoping does not exceed $85 per fathom, the inference to be drawn is that it must be very remunerative mining." In reference to the manner of working the mine, he further stated: "As a practical miner myself, I cannot approve of the plan of underground operations hitherto pursued. I have been called upon to express my opinion hereon. This, for prudential reasons, I have as yet respectfully declined to do. * * * The Caribou is a great mine, second to none in the Western States or Territories. I do not call it a rich mine, but it is a very productive one, and when judiciously managed, and all its product realised, will pay handsome dividends for a great many years to come."

We have so far, in terms brief as possible, given the true history of the Caribou Mine, touching upon some of its most noteworthy incidents and vicissitudes, which have made it celebrated in the mining annals of this country and the Old World. It is a remarkable instance of abundant and inexhaustible resources badly utilised and improvidently worked. By some, it has been claimed that at the time of its sale it ceased to produce its uniform large returns, in consequence of the ore becoming impoverished, or for other causes over which the Dutch Company could exercise no control. Assuming this to be true, would any American mineowner have abandoned a mine that had yielded so largely as to be considered by both foreign and home experts of extraordinary richness, simply because, through criminal mismanagement, it failed to continue its former output?

Take the Con. Va. and other Comstock mines. Did Flood and O'Brien, when the former was non-producing, and its shares selling at $6, relinquish their property to the hands of a Sheriff? No. They placed such indomitable men as Fair and Mackay at the mine; they assessed themselves and their friends to meet expenses, and pushed the development, and to-day they have harvested the just rewards of their energy and perseverance, in being the acknowledged millionaire kings of the Pacific Coast. The same statement holds good in the case of Hayward, when he controlled the Belcher and Crown Point. When they ceased to produce he placed Senator Jones in charge, and both rapidly became millionaires.

But why cite numerous other instances in point? It is the rule, as all know, and but for that fact Nevada would not to day hold a first rank among the great metal producing countries of the world, nor would San Francisco be able to boast of its Sharon, Hayward, Flood and O'Brien, Mackay, Fair, Lent, Jones, and others, who have accumulated their millions from maintaining an indomitable faith in their mineral possessions, placing them in charge of men of undoubted skill, energy, and experience. We firmly believe, in conclusion, that if the owners of the Caribou, the Mineral Hill, and other true metalliferous veins would adopt a similar course of determined systematic development we should not in the future have the complaint of foreign capitalists so frequently dinned into our ears—that "mining investments in this country are neither safe nor profitable."—*Denver Mirror* (Colorado).

A GREAT GOLD MINE—ONE THAT RUNS AS HIGH AS $100,000 TO THE TON.—The American Mine, owned by Hiram Hitchcock, and superintended by Prof. J. Alden Smith, is the most extensively worked in Sushine district, and for quantity and richness of ore one of the most wonderful mines in the world. The "Courier" says it is turning out large quantities every month that sell to the smelters at from $100 to $6000 per ton, and has paid large dividends constantly from the very commencement. The first class ore, by the ton, assays $5000 to $12,000; the second-class, about $800; and the third class, $200. Pieces can be picked from any of the first-class sacks that will yield from $1 to $3·50 per ounce, or at the rate of $30,000 to $1000 per ton. The quantity and quality of the ore has gradually but constantly increased from the surface, and now at the depth of 220 ft. the vein is fully twice as large as it was at the surface, and the ore is far richer. From what is already known of this remarkable vein few will dispute the assertion that no mine thus far discovered has produced such extraordinary yields as the American at Sunshine. Its character under development proves it to be a true fissure, strong and exceedingly rich in precious metal. Its net returns at this time, and since the first 10 ft. of opening had been accomplished, have been and are greater than those of any other deposit of gold bearing mineral in this country. Much of the crevice matter is worth from $10 to $40 per pound, and selected specimens have returned at the rate of $200 per ton. The Chicago "Inter Ocean," in speaking of this district, says—But the latest mining sensation is the recent development in the Sunshine district of Boulder County. Tellurium has heretofore been found in only three localities in the world. It carries the richest deposit of gold. This species of ore is found in this district. Its yield is well nigh fabulous. The entire locality develops telluride ore, but among the discoveries the American mine has been worked to a demonstrable extent. The shaft is only down 220 ft., worked by a hoisting engine. The vein is 2 ft. thick, of which a streak of 7 in. or 8 in. is pay ore. The first-class of this is shipped to the Omaha Smelting Works, where the net sales average $5650 per ton. To bring this price the ore has to assay $6000 per ton, from which is deducted the freight charges, $100 per ton for treatment, and 90 per cent. of the balance is paid to the owner of the ore. The getting out, sorting, and handling of the ore costs, when laid down in Omaha, $100 per month, freight inclusive. The mine employs 30 men, at a cost of $3000 per month, who produce 30 tons of milling ore in that length of time. Of this ore there is shipped, as first class, to Omaha, 2 to 4 tons per month, and the balance to Prof. Hill's works, at Black Hawk, as second-class. The net profit of the mine is $40,000 per month. The present owners of the mine bought it, when partially developed, for $17,000. It cannot now be purchased at any price within reason.—*Miners' Journal* (U.S.)

THE CALIFORNIA SOAP MINES.—The rock soap mine is situated in the lower mountains or foothills of the coast range in Ventura County, five miles from the city of the same name. It was discovered by Mr. A. F. Hubbard while prospecting for coal. He accidentally dislodged some that fell into water and dissolved. It being a new experience to see rock dissolve, he gave it his attention, found it soapy, took it home to experiment with, and soon learned its virtues; yet, strange to tell, his family used it for nearly a year before it was given to the public, when Mr. Hubbard associated himself with Messrs. Cronk and Bickford forming the present company, who are sole proprietors of this wonderful mine. It is accessible only through a canyon leading to and opening upon the beach. The coast line stage road passes the mouth of this canyon three miles below the mine. This canyon or ravine penetrates one of the wildest possible volcanic regions. A little stream follows its course, an almost "lost cause" in summer, but in winter a raging, rushing, torrent, which after draining immense heights and many a rugged mountain side, finds its way to the ocean, often bearing along in its fearful strength huge boulders and entire trees. Along the side of this ravine, sometimes in the bed of the stream, sometimes high up in its precipitous banks, winds a little trail leading to the soap mine, travelled only by the safe pack-mule and hardy miner. The rock resembles chalk or lime. At the southern extremity is an extensive deposit, veined, marbled, and parti-coloured, resembling Castile soap. The ledge at its opening is 15 to 20 ft. wide, crops out for 2000 ft., with an unknown depth. The lode is well defined with wall rocks of hard slate stone, and has, in common with the slate and sandstone strata about it, been thrown up from the depths and turned completely on edge. In its vicinity is a mountain of gypsum, also turned up on edge; indeed, the whole country bears evidence of fearful convulsions, also of some time having lain peaceably at the bottom of the ocean; for on the highest mountain tops can be found nearly perfect sea shells and various specimens of marine matter.—*San Beaventura (Cal.) Reporter.*

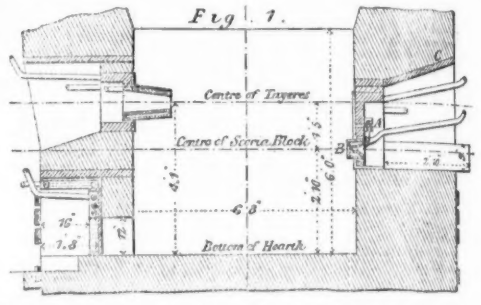
STOP-COCKS AND VALVES.—The closing detail of the improved valve invented by Mr. JOSEPH ANDERSON, of Glasgow, is a diaphragm or washer of vulcanised rubber or other suitable flexible material, held and acting as in what is known as the Lambert tap. The diaphragm has a metal centre or spindle attached to it, and this centre is connected by a screw to an upper spindle. The cover is made with a cavity, in which a spring is placed. The spindle is lifted by an improved contrivance, consisting of a double rolling cam, formed with a handle, and jointed by a cross pin to the valve spindle. A small bore is formed through the metal centre of the diaphragm so as to communicate with the space in the cover, and when the handle is let go, after opening the valve the spring nearly closes the diaphragm, but without suddenness or concussion, and immediately afterwards the water or fluid getting to the upper side through the small bore in the metal centre insures the complete and tight closing of the diaphragm.

STEAM PUMPS.—The invention of Mr. JOHN NORTH, of Southington, Connecticut, consists in the combination of an oscillating steam-valve with a steam-moved piston valve extending transversely to the steam-valve and fitted into an auxiliary cylinder, the ends of which communicate with the main cylinder. The oscillating steam-valve works in glands fitted into the steam-chest, and it is provided with a stem which extends through one end of the steam-chest, so that by applying to this stem a suitable lever or starting bar the steam-valve can be moved by hand for the purpose of starting the pumping engine. The steam cylinder and the pump cylinder are secured together by a tubular connection which is made in sections, each section containing a gland and stuffing box, so that when said sections are drawn together either by a nut or by flanges and bolts, a steam-tight joint is formed on the piston-rod which extends through said tubular connection. The double-acting pump cylinder has two induction and two eduction ports located each side, or nearly on line with the centre of the pump cylinder, and all of said ports have separate passages one from the other, and the valve from each pump and its seat are likewise independent of each other, so that the pump can be worked single or double-acting.

LURMANN'S CLOSED FURNACE HEARTH.

An interesting paper on furnace hearths was read at the Cleveland meeting of the American Institute of Mining Engineers, by Mr. G. Asmus, of New York. He explained that the fore-hearth is a prolonged opening in the lowest part of the hearth, from 2 ft. to 3 ft. wide, 4 ft. to 6 ft. long, and from 2 ft. to 3 ft. high. It is a more or less fire-proof box, cooler than the inside of the hearth, and is apparently made for the purpose of letting the cinder out. Its front is closed by the dam, over which the cinder runs and through which the iron cast takes place. As no iron is made in this part of the furnace—it being below the range of blast—and as it forms in most cases a source of daily work and sometimes the cause of most serious troubles, it is interesting to see why this thing was made at all. In olden times the furnaces had no fore-hearth; a vertical slot a few inches wide was cut into the front hearthstones, reaching to the bottom, and iron and cinders were tapped through the clay which closed it. Then furnaces were called blauofen, and blaseofen—blow furnaces; and up to the present day some of those metallurgical relics have withstood the pressure of our fast times. There are in the remote mountains of Steyermark charcoal furnaces, which make every day hardly a few tons of excellent iron. But a time came when men were no more satisfied with those little smelting pots, into which a gentle stream of air was blown through one nozzle, which received its scanty supply from a leather bag, squeezed by some tired water-wheel. Larger dimensions, more tuyeres, higher pressure, finer steam-engines and hot blast produced more iron and more cinder. Soon the tapping slot in front got too hot, it was washed by the cutting fluids, and the natural move was to get further off from the hearth. The slot became a prolonged outside bar, in which the cinder could rise—forming a communication pipe with the hearth. But this part fills up not only with fluid, iron, and cinder, but coal and half-melted ore float into it, and, as the blast is intercepted, no combustion and no fusion can here take place. So this ore and coal become rubbish, and often of a dangerous kind. Cast iron clings to it, and after the tap is made enough air blows upon it to effect a partial puddling, and there results a tenacious mixture of all kinds of steel and wrought-iron, which paste the whole pile together.

Fig. 1.



To prevent this the fore-hearth has to be cleaned out, and that is what the smelters call working the furnace. The loss of time by stopping the blast amounts to from two to four hours out of the twenty-four. Lurmann's idea will be readily understood from the above diagram (for which, as well as for the description of the furnace, we are indebted to *Engineering*), and can be explained in a few words. The fore-hearth is only made to get rid of the cinder; it is a troublesome additional construction, which has nothing to do with the smelting process proper at all; let us cut off this fore-hearth completely and tap the cinder through an opening just wide enough to suit the purpose, but which cannot burn out. It must be done by a water-cooled casting. This has to be a foot or so below the range of the tuyeres, and may be put in any part of the circumference of the hearth wherever it seems most convenient. The iron tap in front is a separate matter; it may be water-cooled, as by the usual dam. Two great advantages are gained—cinder and iron are tapped directly from the hearth, and all the loss of time and all the labour in cleaning the hearth are saved. Quite a number of other advantages are gained. The tuyeres can be put absolutely equi-distant, as no weak place has to be protected, and, in consequence, the smelting becomes perfectly even and the smelting column sinks vertically. As the heat is properly distributed the quality of the iron made in the different parts of the smelting one is uniform. The blast is always on, and as no slow combustion takes place in the furnace while an open hearth is open, no coal is wasted. The air-heating furnaces are always kept in the same temperature, because the blast is always on; no coal is wasted, and clay and tools are rendered unnecessary. A great many of these furnaces have run with perfect success for years in all parts of the country. The increase of furnace product between the old system, as it was eight years ago, and the closed front in full, has been found by careful comparison of a number of furnaces in Germany to be between 15 and 20 per cent.; the saving of fuel about 10 per cent.

One objection, the burning of the iron cinder blocks, has been done away with, by using hollow cast bronze blocks. These are almost indestructible; the cinder outlet remaining always of the original width of 1¼ inches, the cinder runs off quietly and no hot air is blown out with it, though the blast is always on with full pressure.

IMPROVEMENTS IN PISTONS.—The invention of Messrs. LEPRINCE ROY and Co., of Vevey, Switzerland, has for its object improvements in pistons especially applicable to machinery for compressing air and to pumps. The piston is formed without packing rings, the ordinary packing rings being replaced by the introduction of water into the interior of the piston through a hollow rod which passes from the back of the piston to the exterior of the cylinder. The water introduced should be at a pressure at least equal to the maximum pressure in the interior of the cylinder, in order that the water circulating in grooves around the exterior of the piston may be in equilibrium with the pressure behind the piston, and form a perfect hydraulic joint.

IMPROVED SAFETY CAGES.—Peculiarly constructed bevil clamps are, according to the invention of Messrs. CARLILE and ELLIOTT, of Steubenville, U.S., used for locking the cage or platform to the guides when the rope breaks, each of which clamps has parallel bearing surfaces placed obliquely to the levers, one within the other, and pivoted crosswise together, so that each lever thus bites on both sides of the guides. These levers may be connected in various ways with the platform, so that its weight will cause them to bite upon the guides. Means are also provided for opening and clamping the levers.

IMPROVED GAS-ENGINES.—The invention of Mr. A. DE BISSCHOP, of Paris, comprises—1, the increasing the speed of action of the explosive mixture of air and gas upon the piston by increasing the length of stroke of the piston, and reducing its surface in the same proportion; 2, the preliminary heating of the engine before starting by a gas stove or other means of applying heat; 3, the substitution of large radiating surfaces for cold water, for moderating the temperature of the engine when at work; 4, the use of a peculiar arrangement and combination of return connecting-rod, crank, and slide block, for transferring the motion of the piston to the crank-shaft; 5, a mode of distributing the air and the gas by a single equilibrium slide valve, and arrangements for bringing the air and the gas to such valve; 6, special arrangements and constructions of air and gas valves; 7, a peculiar combination of appliances for driving one or more machines having an intermittent working, such as sewing-machines and the like, from a single gas-engine, and for regulating the supply of gas in accordance with the demand.

BLAKE'S PATENT STEAM PUMP.

MORE THAN 8000 IN USE.

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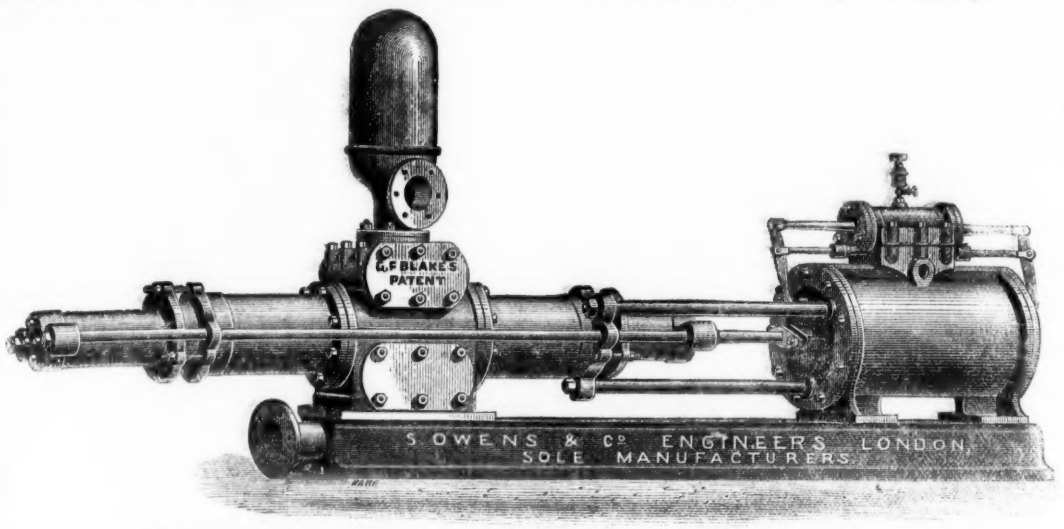

Blake's Improved Double-plunger Steam Pump.

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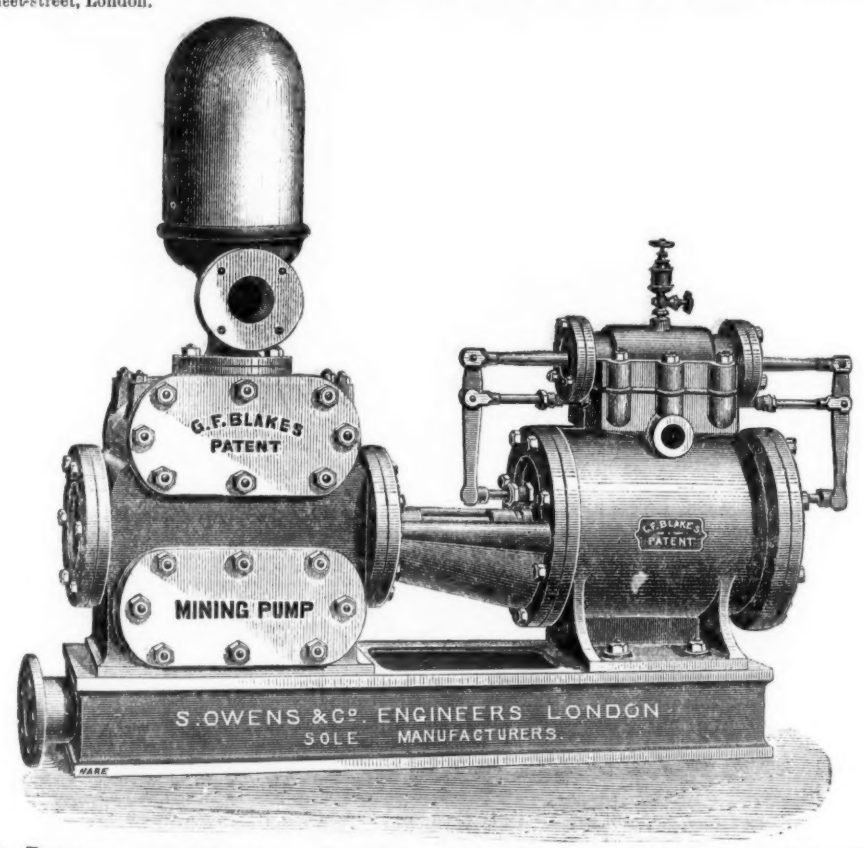
In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.



Blake's Improved Mining Pump, with Patent Removeable Lining to Pump Cylinder,

Any combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:—

Dia. of steam cylinders.. In.	12	12	12	12	14	14	14	16	16	16	16	18	18	18	18	20	20	20	20	24	24
Dia. of water cylinders.. In.	3	4	5	6	4	5	6	4	5	6	8	4	5	6	8	5	7	8	9	6	8
Length of stroke ..... In.	18	18	18	24	24	24	24	24	24	24	24	24	30	30	30	30	30	36	36	36	42
No. of strokes per minute..	30	30	30	30	25	25	25	22	22	22	22	22	22	22	22	20	20	17	17	17	15
Quantity in gallons per hour, approxmately ...	1440	2610	4200	5940	2940	4620	6600	2646	4158	5940	10620	2646	5160	7500	13260	4586	9000	12360	15660	6720	20

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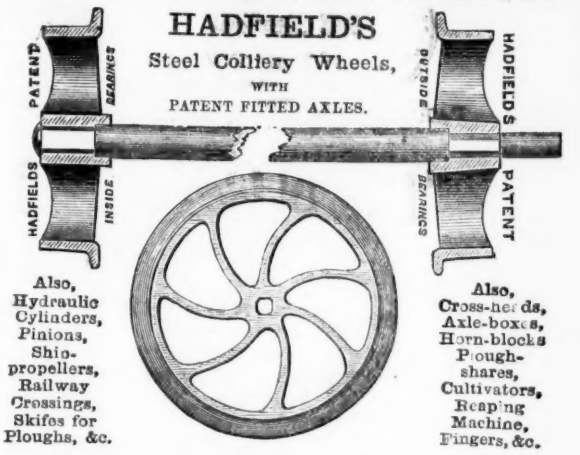

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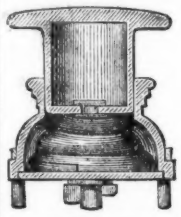

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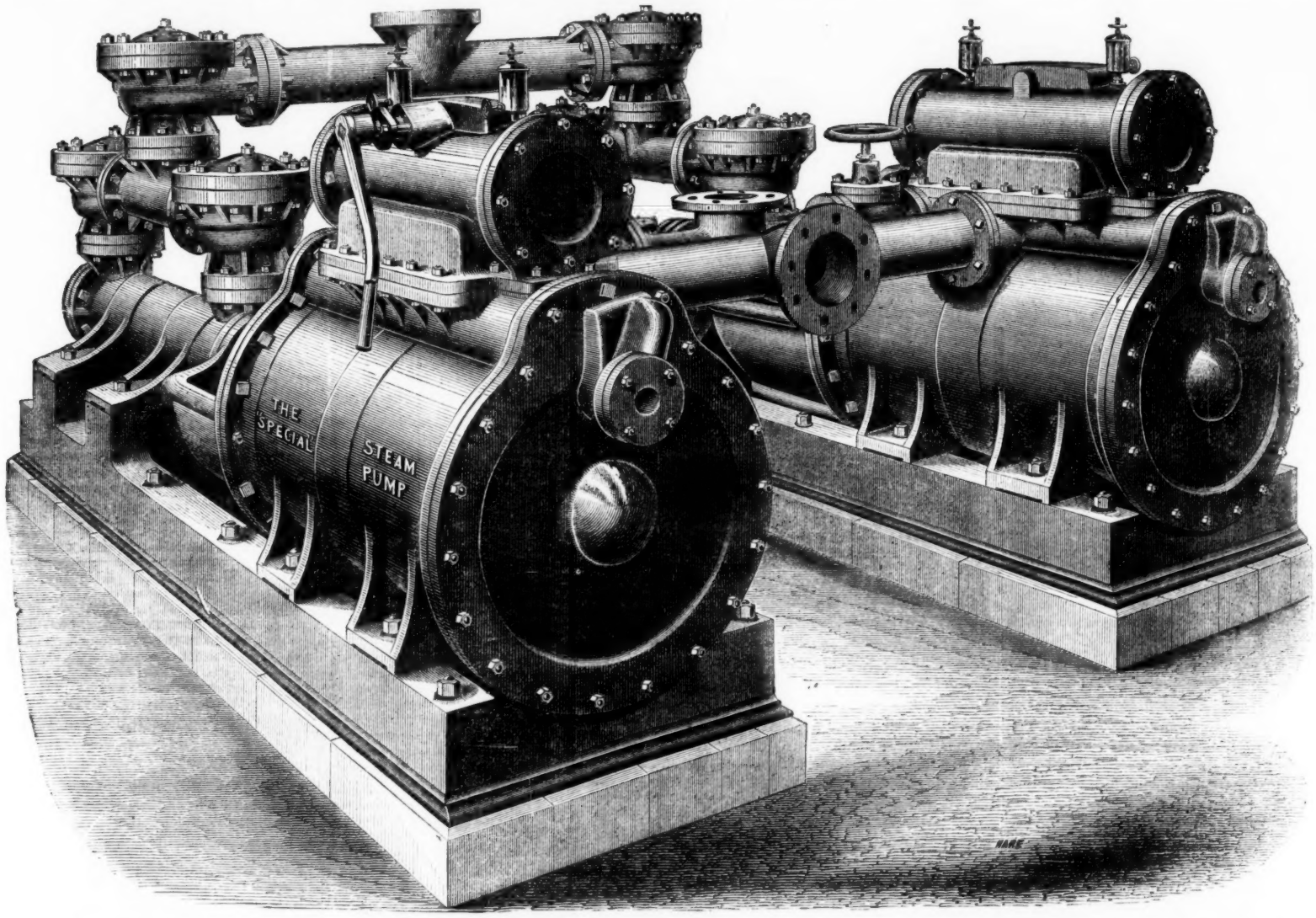

PAIR OF THE "SPECIAL" DIRECT-ACTING STEAM PUMPS SUITABLE FOR HIGH LIFTS IN MINES, SIMILAR TO MANY SUPPLIED BY TANGYE BROTHERS AND HOLMAN.

The following extracts from a letter, received by Tangye Brothers and Holman, from J. Bigland, Esq., dated Feb. 25, 1875, refers to a "Special" Direct-acting Steam Pumping Engine supplied four years ago to Messrs. Joseph Pease and Partners, for the Adelaide Colliery, Bishop Auckland. The engine is throwing about 8000 gallons per hour, 1040 feet high, in one direct lift:—

"The underground pumping engine at Adelaide Colliery is working night and day. It does its work satisfactorily, and gives us very little trouble. Some of the cup leathers which form the plunger packing have worked three months. The working barrel is in beautiful condition. The average duration of the valve seats is about eight months; they work and keep tight as long as there is a bit of them left. I expect the valves (Holman's patent) and the buffers will last as long as the colliery."

Extract from a letter received by Tangye Brothers and Holman from W. H. Eagland, Esq., dated Feb. 27, 1875, in reference to a "Special" Direct-acting Steam Pumping Engine supplied two years ago to the West Yorkshire Iron and Coal Company near Leeds, to throw 16,000 gallons per hour, 465 feet high in one direct lift:—

"It is at work night and day. Our man goes down to the pump twice a day (Ten A.M. and Four P.M.), to supply the tallow cups. After this it is left every day till he comes next morning, when he goes down again at Ten A.M. as before. The only repairs the pump has had for 12 months are one bucket, which had worked since we got the pump, and one valve seat, but no valve, so it has cost very little. Its first lift is 70 yards perpendicular, then the water passes up pipes for half a mile, ascending another 70 yards, and then another perpendicular pipe of 15 yards—total, 55 yards vertical height.."

Extract from the Official Report of the Commission of the German Empire on the Vienna Exhibition of the 1873, treating on Pumping Engines:—

"Contrary to these older pumping engines exhibited, there is now nearly every where the opinion established that the ('SPECIAL') pumping engines placed underground, which are made on A. S. Cameron's principle by Messrs. Tangye, are preferable to all. They do much duty combined with great compactness. They dispense entirely with the troublesome rod arrangement, giving often rise to stop pages, so that they will be applied shortly to a great extent, and are already in use in many localities. There is no doubt that this is in every respect practical system will command a general adaptation."

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The following are a few of the Sizes for High Lifts in Mines:—

Diameter of Steam Cylinder .....In.	7	8	9	9	10	10	12	12	12	14	14	14	16	16	16	16	18	18	18	18	21	21	
Ditto of Water Cylinder .....In.	3	3	3	4	3	4	3	4	5	4	5	6	4	5	6	7	5	6	7	8	5	6	
Length of stroke.....In.	24	24	24	24	36	24	36	36	36	36	36	36	36	36	36	36	48	36	36	36	48	48	
Gallons per hour approximate	1830	1830	1830	3250	1830	3250	1830	3250	5070	3250	5070	7330	3250	5070	7330	9750	5070	7330	9750	13,000	5070	7330	
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump	325	425	540	300	665	375	960	540	345	735	470	330	960	615	426	312	775	540	400	300	1058	740	

CONTINUED.

Diameter of Steam Cylinder .....In.	21	21	21	24	24	24	24	24	26	26	26	26	26	30	30	30	30	30	32	32	32	32	
Ditto of Water Cylinder .....In.	8	9	10	6	7	8	9	10	7	8	9	10	12	8	9	10	12	14	8	9	10	12	
Length of stroke.....In.	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
Gallons per hour approximate	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	9750	13,000	16,519	20,000	30,000	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump	413	326	264	960	700	540	427	345	827	633	500	405	282	840	665	540	375	275	960	758	625	426	

PRICES OF THE ABOVE ON APPLICATION.—FOR SIZES AND PRICES OF PUMPS FOR LOWER LIFTS SEE SEPARATE LIST.

HOLMAN'S PATENT CONDENSER will be found a great acquisition to all kinds of Steam Pumps, as not only is the exhaust steam completely condensed, and the annoyance from same blowing off entirely got rid of, but a vacuum is obtained in the steam cylinder saving from 20 to 50 per cent. in fuel, and increasing to a considerable extent the economy and efficiency of the Pump.

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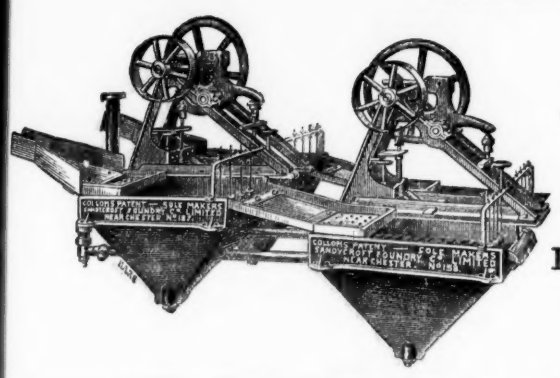

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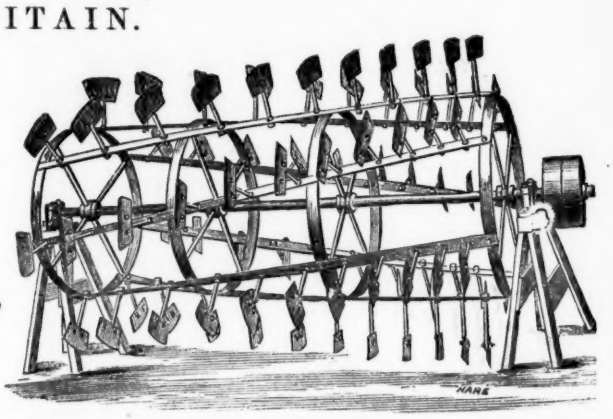

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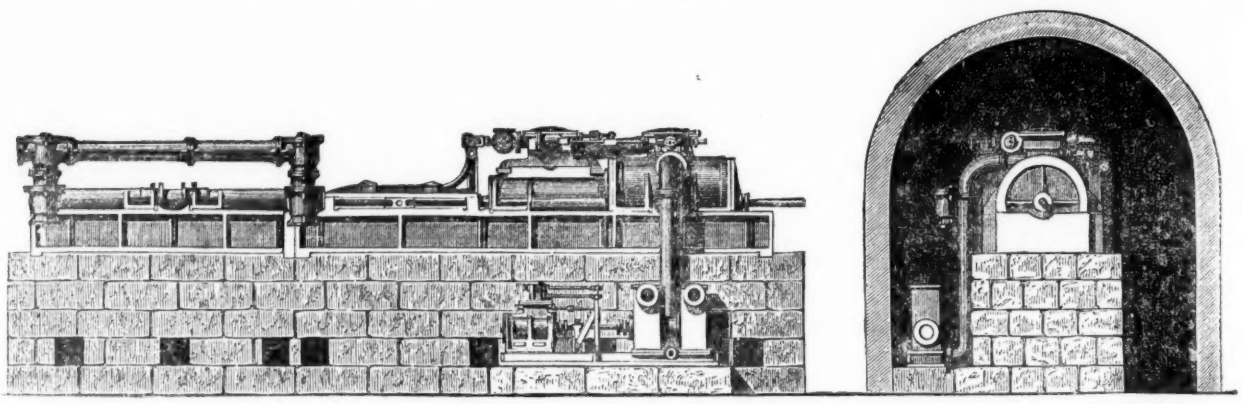

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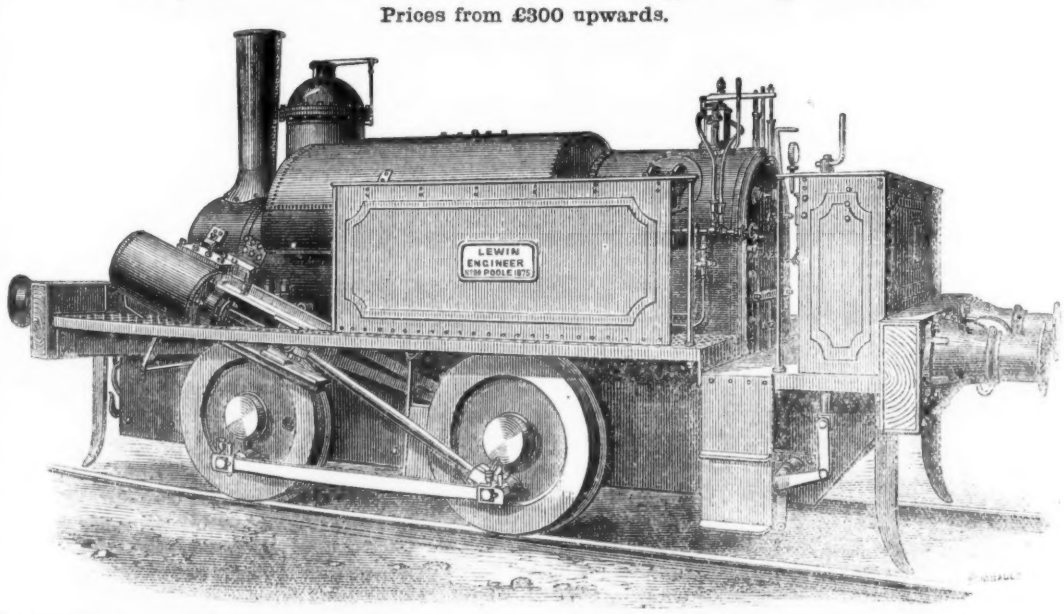

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